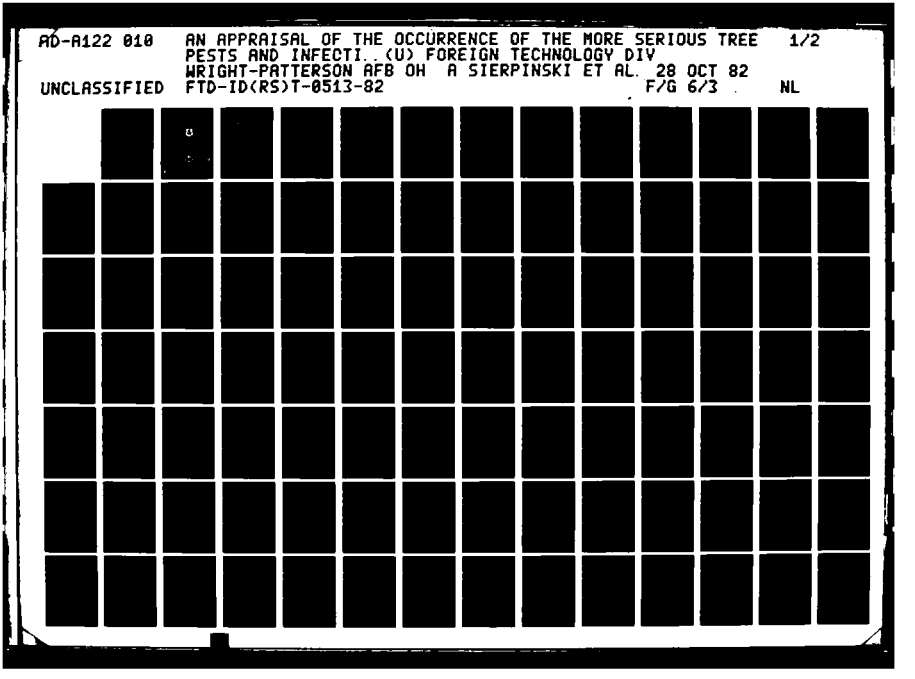
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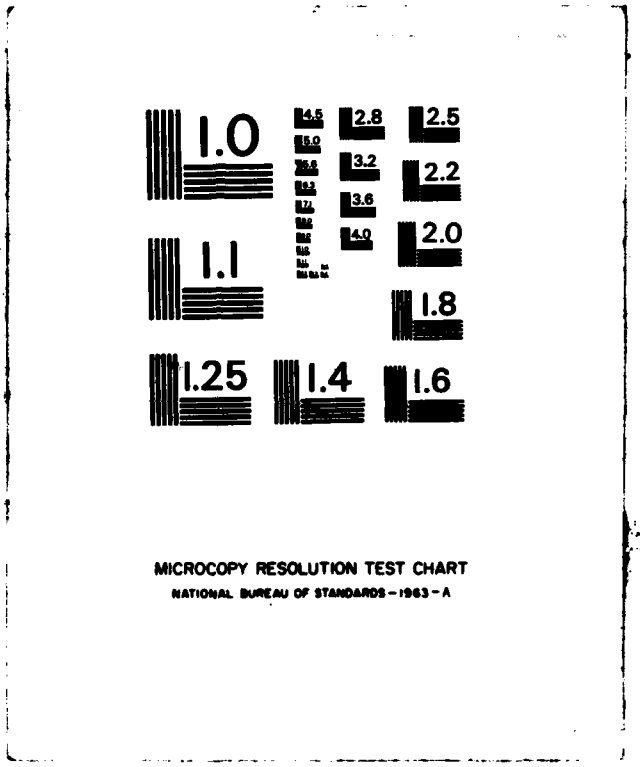
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FOREIGN TECHNOLOGY DIVISION

AN APPRAISAL OF THE OCCURRENCE OF THE MORE SERIOUS TREE PESTS AND INFECTIOUS DISEASES IN POLAND IN 1980 AND A FORECAST OF THEIR APPEARANCE IN 1981

by

Zbigniew Sierpinski, Edmund Sliwa, et al

Approved for public release;
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EDITED TRANSLATION

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Introduction

In considering the connections between the weather in 1980 and the appearance and development of forest pest insects, the most essential assertions have to do with the nun moth (lymantria monacha L.), considering the range attained by this moth over the past several years. Thus, not even the relatively mild winter of 1970/1980, neither the cold spring, nor the summer and autumn months, which were heavy in precipitation, had any visible effect on the viability of the nun moth in its individual stages of development, nor was there, therefore, the expected natural decreases in its numbers.

Great hope was connected with disturbances in the phenology of this pest insect. In the years favorable from the point of view of weather, the hatching-out period for the nun moth begins with the florescence of pine trees, so that the young caterpillars can consume the flower pollen as their first food, and this is -- according to data from the literature -- a condition for their health and continued regular development. The meteorological conditions of the spring of 1980 caused a considerable shift in the pest insect and pine development, the pine being its main food plant, in such a way that the caterpillars that hatched earlier did not have developed male flowers at their disposal, and from necessity their forest food was old pine needles and needles that were just developing. The effects of these disturbances in the food base on the numbers of the pest could not, however, be observed.

The spring weather system had, despite this, an important influence on the possibilities and feasibilities of correct assessments of the damage to tree stands by the nun moth. In contrast to the previous year, when the caterpillars, which had not formed colors shortly after hatching, migrated to the tree crowns, in the spring of 1980, the young caterpillars remained very long in their colors (even up to several hundred days), and this made it possible to control the numbers of this pest better, as well as making it possible to discover many areas of their appearance not disclosed earlier.

Despite the apprehensions, no negative effects from the abundance of precipitation in the summer and the autumn was noted on the regeneration processes in stands damaged by the feeding of the primary pests from previous years. To the contrary, as regards the mountain region tree stands, in the system of weather conditions from the just past year, a pronounced beneficial process in the regeneration of the damaged spruce trees has been noted. It is possible to conclude that the decisive factor here was the moderate precipitation and the mild temperatures at the beginning of the vegetation period.

Among other weather factors, worthy of mention also are the strong winds, due to which an extensive base of reproduction for secondary pest insects is formed annually. In 1980, in addition to the strong gusting winds that always arise in the autumn-winter period, there were tornadoes in various regions of Poland during the summer period. These increased even more the great annual extent of damage in the form of breakage and uprooting.

AN APPRAISAL OF THE OCCURRENCE OF THE MORE SERIOUS TREE PESTS AND INFECTIOUS DISEASES IN POLAND IN 1980, AND A FORECAST OF THEIR APPEARANCE IN 1981

Prof. Zbigniew Sierpiński, Ph.D., Prof. Edmund Śliwa, Ph.D., Prof. Czeslawa Kozlowska, Ph.D., Edmund Górnaś, Ph.D. (Eng.), Piotr Lutyk, M.A. (Eng.), Tomasz Hufleit, M.A. (Eng.)

PART I

A. TREE ROOT PEST INSECTS

Among the many insects causing great damage in forestry, the kinds that destroy and damage the tree root and the saplings have great significance.

From an analysis of forecast materials acquired by the Societies for the Protection of Forests, it emerges that in about 35% of forest inspection jurisdictions in Poland for 1981 there were increased occurrences of tree root pests (Tables 1 and 4).

The overall ground area requiring pest eradication treatments amounts to 715 ha, and including 76 ha of non-State land (Table 1).

In comparison with the previous year, there was an increase in the overall ground area of forest requiring applications of chemical substances by 272 ha, that is, an increase of about 60%. The area threatened by grubs in 1981 on the territories of the individual State Forest District Administrations varies within the range 13 ha (OZLP Wroclaw) to 126 ha (OZLP Lódź).

The threat in nurseries comes to 238 ha, which amounts to 34% of the overall area designated for insect eradication soil treatments, and in areas of ongoing afforestation it is 433 ha, that is 60%, and in sections with additional and backup cultivation, 44 ha, that is 6% (Table 1).

Table 1. The threat of tree root pests according to tree nurseries and tree fields in 1981

Entry No.	OZLP*	No. threatened forest inspection jurisdictions	Surface area threatened in ha				Surface area designated f/spring control, in ha
			Nurseries	Current afforestation	Corrections & additions	All together	
1	Bialystok	15	9	87	1	97	
2	Katowice	16	23	11	-	34	5
3	Kraków	9	12	11	3	26	-
4	Krosno	5	2	12	9	23	-
5	Lublin	23	28	58	21	107	-
6	Lódź	14	13	107	6	126	-
7	Olsztyn	14	17	28	-	45	-
8	Pila	5	12	7	1	20	-
9	Poznań	5	6	12	-	18	-
10	Szczecin	11	33	15	1	49	-
11	Szczecinek	12	39	25	-	64	-
12	Toruń	22	14	42	1	57	-
13	Wroclaw	8	3	10	-	13	-
14	Zielona Góra	6	25	8	1	34	-
	Other administrations:						
	Warsaw Forest Society	1	2	-	-	2	-
	All together	166	238 = 34%	433 = 60%	34 = 6%	715 = 100%	16
	Including non-State forests					76	

*State Forestry District Administration

With regard to the portion of forest area threatened by individual types of "root pests" -- the greatest danger comes from the grubs of May bugs and cock-chafers, amounting to 68% of the overall area threatened, followed by summer chafers, 15%, other kinds of grubs (particularly, garden chafers), 16%, and June bugs, about 1% (Table 2).

The extent of damage caused by grubs depends, to a considerable extent, also on the type of forest environment. The most frequent and greatest number of pest insects are found in forests designated for afforestation of the following forest sites: pioneer woods and mixed pioneer woods (22% of overall area of threat), followed by former arable lands, 20%, and in mixed forest environments, 17%. On the other types of forest sites, the threat varied between 1 and 6% (Table 3).

In 1980, from considerations of the necessity of carrying out chemical pest control against the root pests, the Forestry Research Institute suggested the use of powder and dust insecticides produced in Poland, with the trade names "Owadziak" or "Pędraczak," and with expenditure quotas depending on the purpose of the action and the age of grubs, within the limits of 100-200 kg/ha.

It should be mentioned that in comparison with the previous year, there was a further improvement in the quality of materials forwarded from studies of the extent of the grub infestation. The errors encountered were not of a general nature and depended on the following:

(a) the placement of the grubs in nonsaline water, as a result of which the putrifaction set in quickly;
(b) the placing of all material found from several holes together into one bottle;
(c) the forwarding of the lists of results from the "Studies of Soil Infestation by Grubs" in a single copy, as well as from filling it out without enough detail and not consistently enough (a lack of drawings of the placment of test holes).

Table 2. Tabulation of surface area of tree nurseries and tree fields threatened by individual types of tree root pests in 1981

Item No.	OZLP*	Type of pest: Cockchafers 1-yr	2-yr	3-yr	Mixed strain	All together	Summer chafer 1-yr	2-yr	Mixed strains	All together	June bug	Other types	All together
1.	Białystok	37	4	1	34	76	2	2	16	18	1	1	97
2.	Ostrołęka	6	8	1	-	15	-	1	-	1	1	17	34
3.	Łomża	22	2	-	-	24	-	1	-	1	-	1	26
4.	Łuków	12	1	-	9	22	-	-	-	-	1	-	23
5.	Lublin	3	60	36	4	103	1	3	-	4	-	1	107
6.	Łódź + WZL	10	71	3	1	85	1	20	-	21	-	12	118
7.	Olsztyn	6	9	6	22	42	1	1	-	2	1	-	45
8.	Piła	-	3	4	-	7	-	1	-	1	-	12	20
9.	Poznań	-	-	1	-	1	-	13	-	13	-	1	15
10.	Szczecin	2	-	3	-	5	-	8	-	8	-	36	49
11.	Szczecinek	-	6	27	-	33	6	8	-	16	-	18	66
12.	Toruń	20	3	5	10	38	4	4	2	10	1	8	57
13.	Wrocław	1	6	2	2	11	-	1	-	1	-	1	13
14.	Zielona Góra	-	-	19	-	19	-	4	-	4	-	13	36
Total		118	171	110	82	481 = 66 %	18	78	17	130 = 18	6 = 1 %	120 = 16 %	736 = 100 %

Table 3. Tabulation of surface area of nurseries and tree fields threatened, according to type of forest site in 1981

Item No.	OZLP*	Types of forest site: Former arable land	Pioneer woods	High PW**	High woods	High MPW***	Mixed woods	High pion. forest	Mixed high PF	Mixed forest	Lack of data	All together
1.	Białystok	37	1	6	-	15	10	-	-	28	-	97
2.	Ostrołęka	1	-	12	-	10	-	1	1	1	8	34
3.	Łomża	-	-	6	-	9	1	1	-	10	-	26
4.	Łuków	-	-	0.5	-	6	-	2	1	12	-	23
5.	Lublin	32	2	9	-	30	-	9	1	24	-	107
6.	Łódź + WZL	36	6	34	-	41	-	3	-	10	-	126
7.	Olsztyn	3	1	10	3	2	-	1	10	3	-	45
8.	Piła	4	2	2	-	1	-	-	-	3	8	20
9.	Poznań	-	-	12	-	2	-	-	-	3	-	15
10.	Szczecin	1	-	4	3	10	-	22	-	1	8	49
11.	Szczecinek	5	1	21	-	6	-	-	-	14	10	64
12.	Toruń	34	1	8	-	6	-	-	-	8	-	57
13.	Wrocław	1	-	7	-	1	-	1	-	2	1	13
14.	Zielona Góra	-	-	9	-	16	1	4	-	-	2	34
Total		141 = 20 %	13 = 2 %	168 = 23 %	6 = 1 %	166 = 22 %	12 = 2 %	48 = 6 %	13 = 2 %	128 = 17 %	37 = 5 %	736 = 100 %

**PW = pioneer woods; ***MPW = mixed pioneer woods; PF = pioneer forest

*State Forest District Administration

As against instructions from the OL [expansion unknown], the forest inspection jurisdictions carry out control and checking on an insufficient number of test holes.

1. May bug/cockchafer (Melonontha melonontha L., M. hippocastani F.)

As in previous years, these types also occupy the greatest ground area in 1981 designated for insect control of the soil. The greatest threat by cockchafer and May bug grubs in the nurseries and tree fields exists on the OZLP [State Forest District Administration] territories about Lublin (102 ha), which amounts to 21% of the overall threatened area, followed by the OZLP Lódź (85 ha), 17%, and the Bialystok OZLP (76 ha), 16%; in the remaining District Administrations of the State Forest system, this surface area is smaller, varying from 4 to 42 ha. In 1980 in the State Forest District Administrations of Bialystok, Kraków, Krosno, and Toruń, one-year grubs predominate, two-year grubs in the other administrations, and three-year grubs in the Szczecinek and Zielona Góra OZLP's (Table 2).

A flight of adult insects of only slight intensity is forecast for the forest inspection jurisdictions of Kozienice and Plock (OZLP Lódź); Biala Podlaska and Janów (OZLP Lublin); Gryfice and Smolarz (OZLP Szczecin), and finally, Golabki (OZLP Toruń).

It is foreseen that there will be no insect control measures taken against adult insects in 1981.

2. Summer chafer (Amphimallon solstitialis L.)

This pest insect occurs most frequently on afforested former arable land and on idle land, as well as in fields designated for additional and backup cultivation.

Table 4. Tabulation of forest inspection jurisdictions on which threat to nurseries and tree fields by root pests was confirmed in 1981

State Forest District Administration [OZLP]	No. forest inspection jurisdictions/ threat area in ha	State inspection jurisdiction
1	2	3
Białystok	15/97	augustów, Bielsk, Ełk, Głęboki Bród, Mańkulińskie, Nurzec, Pisz, Płaska, Pomorze, Rajgród, Rudka, Suwałki, Szczebra, Wałcz, Żednia
Katowice	16/34	Bielsko, Brynek, Chrząnów, Kędzierzyn, Kłobuck, Kolonowskie, Koniecpol, Koszęcin, Lublinice, Namysłów, Prudnik, Rybnik, Siewierz, Tułowice, Turze, Złoty Potok
Kraków	9/26	Brzesko, Dębica, Grodnik, Kielce, Łagów, Miechów, Niepołomice, Ostrowiec, Puda Woleniecka
Krosno	5/23	Kołaczyce, Lesko, Narol, Olszyce, Sieniawa
Lublin	23/107	Biała Podlaska, Biłgoraj, Bude Stalowe, Chełm, Janów, Józefów, Krasnystaw, Kraśnik, Lubartów, Łuków, Międzyrzec, Mircze, Parczew, Radzyń, Rozwadów, Siedlce, Sobibór, Staszów, Strzelce, Świdnik, Tomaszów Lub., Włodawa, Świerzyniec
Łódź	14+1/128	Brzeziny, Dobieszyn, Gostynin, Grójec, Kocierzec, Gretniki, Opoczno, Pietrków, Płock, Radom, Radomsko, Spała, Wieluń, Zwoleń, Warszawski Zespół Leśny
Olsztyn	14/45	Elbląg, Górowo Iławeckie, Iława, Jedwabno, Kudypy, Lidzbark, Mrągowo, Nidzica, Ostrów Maz., Pasłęka, Płośnik, Srokowo, Wipsowo, Żagarge
Piła	5/20	Człopa, Krzyż, Okonek, Mirosławiec, Zdrojowe Góra

1	2	3
Poznań	8/18	Gniezno, Grodzisk, Krotoszyn, Oborniki, Piaski
Szczecin	11/49	Barlinek, Bierzwnik, Bogdaniec, Dobrzany, Głuchołazy, Gryfice, Łobez, Myślibórz, Nowogard, Rzepin i Smolarz
Szczecinek	12/64	Bytów, Czaplinek, Drawsko, Człuchów, Gościno, Leśny Dwór, Mirosławiec, Osusznica, Szczecinek, Świdwin, Ustka i Wałcz
Toruń	22/57	Brodnica, Bydgoszcz, Chojnice, Cierpiszewo, Gniewkowo, Golub-Dobrzyń, Gołąbki, Jamy, Kartuzy, Kolbudy, Kościerzyna, Lipusz, Mirachowo, Przymuszewo, Różanna, Runowo, Skrzyszewo, Starogard, Szubin, Tuchola, Włocławek i Żołędowo
Wrocław	8/13	Bardo, Bolesławiec, Chojnów, Głogówko, Grochowo, Lubin, Międzylesie i Złotoryja
Zielona Góra	6/34	Białków, Gubin, Lipinki, Sulechów, Świebodzin i Zielona Góra.

Key:

———— ground surface specified for pest eradication treatment in the forest inspection jurisdiction exceeding 10 ha (17 forest inspection jurisdictions)

- - - - - ground area designated for pest eradication treatment in the range 5-10 ha (20 forest inspection jurisdictions)

no underlining ground area designated for pest eradication treatment less than 5 ha (127 forest inspection jurisdictions).

In 1981, the summer chafer occurred in all the District Administrations of the State Forest across only small surface areas (1-31 ha), with the exception of the OZLP Krosno. The marked predominance of the two-year grub strain is noted, occupying about 75% of the overall area of threat by this pest.

3. June bug (Polyphylla fullo L.)

The June bug is one of the worst root pests for trees and shrubs, occurring in sandy and exhausted soils, most frequently across only small surface areas.

In 1981 it is foreseen that insect control measures for this pest will be undertaken in five forest jurisdictions: Maskulińskie (OZLP Bialystok), Namyslow (OZLP Katowice), Sieniawa (OZLP Krosno), Myszyniec (OZLP Olsztyn), and in Brodnica (OZLP Toruń). The occurrence of the June bug is of a sporadic nature, taking up only about 0.5% of the overall area of threat foreseen for insect control measures in the soil for this year.

4. Cutworm (Agrotis spp.)

Caterpillar cutworms constitute a particular danger in nurseries and pine fields in sandy soils, where huge losses have occurred a number of times. This insect destroys the needles and shoots of the cuttings, as well as bringing about the destruction of the root system to a depth of about 2 cm.

The increased occurrence of cutworm is forecast in 1981 for the territories of 59 forest inspection jurisdictions based in 13 District Administrations of the State Forest. These pests were not attested in only one of the territories of the OZLP Olsztyn (Table 5).

Due to the small population density, the cutworm caterpillar will be controlled this year only in places where it occurs simultaneously with cockchafer (May bug) grubs.

Table 5. Tabulation of forest inspection jurisdictions on whose territories the occurrence of cutworm caterpillars has been confirmed

Item No.	OZLP *	Forest inspection jurisdiction
1	2	3
1.	Białystok	Szczebra
2.	Katowice	Brynek, Kędzierzyn, Kłobuck, Kolonowskie, Koszęcin, Lubliniec, Olkusz, Prudnik, Rybnik, Świerklaniec, Siewierz i Turawa
3.	Kraków	Gromnik, Kielce, Miechów, Niepołomice
4.	Krosno	Narol
5.	Lublin	Biała Podlaska, Chełm Lub., Lubartów, Łuków, Staszów, Tomaszów i Włodawa
6.	Łódź	Brzeziny, Dobieszyn, Kozienice, Piotrków, Radom, Radomsko, Spała, Zwoleń
7.	Piła	Mirosławiec i Zdrojowa Góra
8.	Poznań	Grodzisk i Krotoszyn
9.	Szczecin	Bierzwnik, Dobrzany, Głusko, Łobez, Myślibórz, Nowogard i Rzepin
10.	Szczecinek	Leśny Dwór, Manowo i Wałcino
11.	Toruń	Kościerzyna i Runowo
12.	Wrocław	Bardo, Bolesławiec, Chociemów, Grochowo, Międzylesie i Złotoryja
13.	Zielona Góra	Cybin, Lipinki, Świebodzin, Zielona Góra

*State Forest District Administration

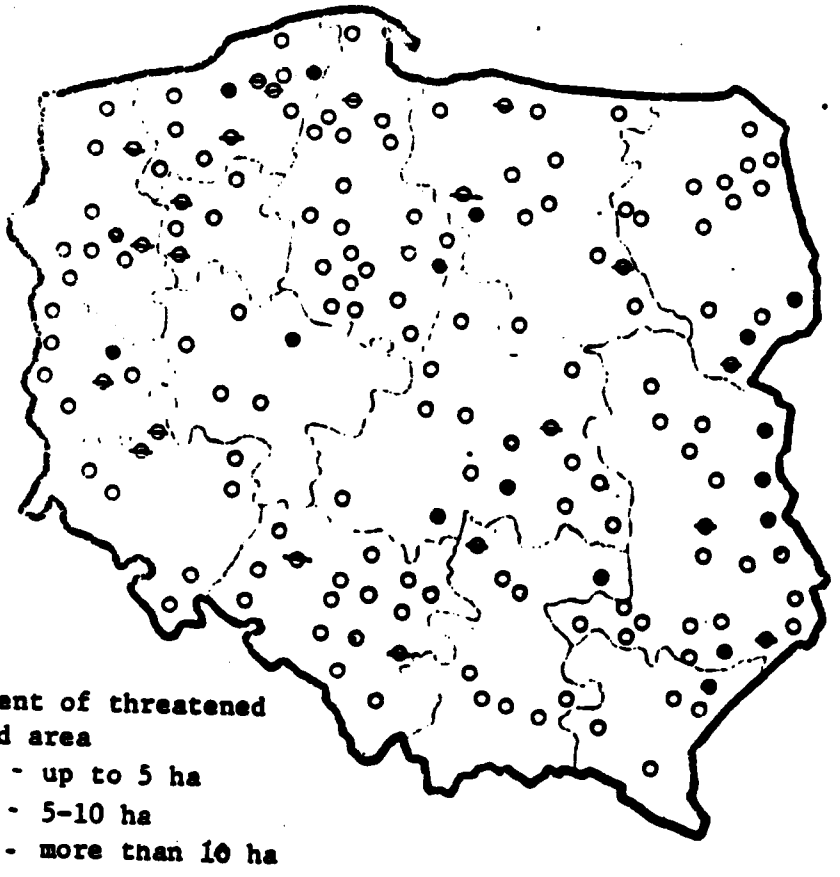

Fig. 1. Forecast occurrence of root pests in 1981.

B. CONIFER PESTS

I. Pine Field Pests and Young Pine Tree Pests

The pest insects belonging to this group are not included among those subject to special forecast methods, and their appearance is noted and detected by means of registration cards and flag cards sent by the forest inspection jurisdiction to the Forest Protection Associations. Additional indications were picked up during the territorial inspections carried out by workers of the Forest Protection Associations and the Forestry Research Institute.

Appropriate remedial measures were undertaken from the time it was confirmed that there was an increased or mass occurrence of this pest, which directly threatened the forest entity.

5. Pine root weevil (Hylobius abietis L.)
Spruce root weevil (Hylobius pinastri Gyll.)

These insects cause great losses, particularly in the three-six year pine and spruce fields.

In 1980 the appearance of root weevils was signalled from 179 forest inspection jurisdictions based on the territories of all the District Administrations of the State Forest. The greatest losses were caused in the OZLP's of Olsztyn, Szczecin, Szczecinek, and Toruń (Tables 6 and 7).

The overall surface area of tree fields overcome by root weevils in 1980 amounted to 9,519 ha, that is, 1,322 ha (14%) greater than in the previous year.

Recovery measures and precautions were undertaken across an overall area of 7,938 ha, that is, 1,580 ha (20%) more than in the previous year. Contact insecticides were used in control (among others, Metox, Owadofos, Tritox), and mechanical precautions were also taken (coverings).

Table 6. Tabulation of area of occurrence and controls for pine and spruce root weevil on the territories of individual forest inspection jurisdictions in 1980

OZLP [State Forest District Administratn]	Overall surface area of occurrence/control	Forest inspection jurisdictions of occurrence/control
1	2	3
Białystok	882/700	Augustów 2/2, Borki 24/24, Czerwony Dwór 110/98, Drygały 30/10, Głęboki Bród 48/48, Maskulińskie 250/200, Nursee 9/9, Pisz 51/51, Płaska 75/75, Pomorse 200/100, Suwałki 83/83
Katowice	595/288	Brzeg 11/11, Chrzanów 1/-, Kluesbork 41/24, Kobiór 62/17, Kolonowskie 10/10, Lublinice 30/26, Olesno 5/5, Prószków 150/103, Prudnik 5/5, Rudy Rac. 200/-, Rybnik 35/17, Strzelce Op. 14/14, Świerklaniec 17/17, Turawa 3/3, Ustroń 5/-, Złoty Potok 6/6
Kraków	71/71	Dąbrowa Tarn. 20/20, Dębica 4/4, Lagów 23/23, Niepołomice 24/24.
Kresno	49/29	Kolbuszowa 20/-, Mielec 9/9, Narol 10/10, Tuszyma 10/10
Lublin	33/33	Buda Stalowska 1/1, Janów Lub. 8/8, Józefów 3/3, Puławy 3/3, Rudnik 18/18
Łódź	135/107	Dobieszyn 14/-, Gretniki 6/-, Kolumna 12/12, Łąck 38/31, Płock 17/17, Sieradz 7/7, Złoczew 37/37, Zwoleń 4/4
Olsztyn	2000/2130	Bartoszyce 18/18, Ciechanów 4/4, Dobrocin 56/56, Dwukoły 15/15, Elbląg 3/3, Iława 15/15, Kudypy 100/100, Lidzbark 132/132, Miłomłyn 18/8, Mrągowo 3/3, Mysłyniec 150/150, Nidzica 321/321, Nowe Ramuki 15/15, Olsztynek 110/40, Ostrów Maz. 150/150, Przasnysz 110/110, Płońsk 17/17, Pułtusk 15/15, Srokowo 15/15, Stare Jabłonki 85/85, Strzałowo 70/70, Susz 20/20, Szczytno 126/126, Wichrowo 190/190, Wielbark 87/87, Wipsowo 150/63, Wyszków 150/150, Zaporowo 155/155

1	2	3
Piła	613/532	Całopa 2/-, Jastrowie 120/66, Krusz 64/64, Okonek 88/88, Mirosławiec 5/5, Potrzebowice 31/23, Sarbia 20/20, Trzcianka 163/163, Wałcz 20/4, Zdrojowa Góra 93/93, Złotów 7/7
Poznań	258/186	Antonin 104/88, Babki 7/1, Gniezno 20/20, Grodzisc 10/10, Grodzisk 12/12, Kaszewo Borowe 15/-, Konin 20/-, Krotoszyn 15/15, Lopuchówko 26/26, Pniewy 15/-, Przedborów 9/9, Taczanów 5/5
Szczecin	1566/1181	Barlinek 29/29, Bogdaniec 1/1, Chojna 20/20, Dobrzany 112/94, Głusko 3/3, Goleniów 28/28, Karwin 27/27, Klinińska 4/4, Kłodawa 180/180, Lobez 250/178, Mieszkowice 137/137, Międzychód 27/27, Międzyzdroje 20/20, Nowogard 113/113, Nosko 75/50, Rzepin 1/1, Skwierzyna 65/65, Smolarz 500/226, Trzciel 6/6, Trzebiel 20/20
Szczecinek	1045/945	Białogard 10/10, Bytów 31/31, Czaplinek 60/60, Czarne 127/127, Człuchów 40/40, Drezyna 102/102, Gościno 18/18, Leśny Dwór 230/140, Lębork 24/24, Manowo 30/30, Niedźwiady 60/60, Osusznica 83/83, Szczecinek 74/74, Świdwin 84/78, Ustka 27/27, Wardyno 10/10, Złocieniec 35/31
Toruń	1164/978	Brodnica 16/16, Bydgoszcz 344/344, Chełmno 28/28, Czerniak 134/134, Dąbrowa 2/2, Dobrzejewice 12/12, Gdańsk 1/1, Golub-Dobrzyń 50/-, Jamy 12/-, Kaliska 7/7, Lipusz 1/-, Lubichowo 88/63, Osie 5/5, Przymuszewo 112/46, Rdzawna 19/19, Rytel 87/87, Strzebielino 8/-, Szubin 148/144, Skrzydlno 62/62, Wojherowo 3/-, Włocławek 31/7
Wrocław	902/834	Bystrzyca 15/-, Chociemów 6/6, Duszniki 82/82, Grochowo 22/9, Głogówko 6/6, Jawor 12/6, Kamienna Góra 82/82, Lubin 4/4, Milicz 84/84, Oława 22/22, Rusztów 160/153 Szklarska Poręba 25/-, Świerzawa 23/23, Wleliniec 84/84, Żmigród 5/3

1	2	3
Zielona Góra	264/264	Białków 43/43, Bobrowice 86/86, Krzystkowice 24/24, Sulechów 32/32, Świebodzin 12/12, Wolsztyn 53/53, Wymierki 14/14
Total	9 599/7 938	179 forest inspection jurisdictions

Table 7. Overall tabulation of area of occurrence and control for pine and spruce root weevil on the territories of individual State Forest District Administrations [OZLP] in the years 1979 and 1980

OZLP	No. of forest jurisdic.		Surface area in ha			
			Occurrence		Controls	
	1979	1980	1979	1980	1979	1980
Białystok	3	11	285	802	285	700
Katowice	14	16	386	695	279	288
Kraków	4	4	63	71	61	71
Krosno	4	4	50	40	41	29
Lublin	5	5	30	33	30	33
Łódź	7	8	166	135	121	107
Olsztyn	26	28	1964	2300	1925	2120
Piła	7	11	704	613	289	532
Poznań	16	13	208	288	186	186
Szczecin	19	20	1450	1588	942	1181
Szczecinek	14	17	808	1045	719	945
Toruń	16	21	1011	1184	767	978
Wrocław	20	15	620	802	617	534
Zielona Góra	11	7	483	264	260	264
Total	166	179	8177	9599	6358	7938

In 1981, it was suggested that a large-scale occurrence should be foreseen just as in the year before, and that chemical preparations should be used. It was recommended that the needled portions of the cuttings, gathered together in bunches, be moistened in a working liquid. The sprinkling of cuttings in sown fields requires a considerably greater outlay in money and labor.

In the tree fields, consideration should also be taken of the bark-boring

beetles (Hylastes sp.), which can cause considerable losses in spots, even without the occurrence of root weevils.

6. Pine weevil (Pissodes notatus F.)

This insect occurs principally at lower altitudes where common pine saplings 3-16 years have been set out, and occasionally on older trees. It prefers to attack saplings weakened by other pests, insects, or parasitic fungi, or else individuals developing defectively as a result of improper planting techniques.

In 1980 the occurrence of the pine weevil was indicated in 58 forest inspection jurisdictions based in various parts of the country. The most numerous occurrences involving the relatively greatest land areas were in OZLP Bialystok (forest jurisdiction Pomorze), Lublin, Olsztyn, and Toruń (Table 8).

The overall land area of tree fields overcome by the pine weevil in 1980 amounted to 3,839 ha, that is, 708 ha (19%) more than in the previous year. On the other hand, controls carried out were done mechanically, primarily by means of tree removal and burning of infected saplings, for an overall area of 2,748 ha, that is, 174 ha (8%) more than in the previous year.

In 1981 recommendations were forwarded for control of this pest by means similar to the ones undertaken in previous years.

7. Weevils (Cneorrhinus plagiatus Schall., Strophosomus spp.)

These insects cause greatest damage in the 1-2 year pine fields in light soils (exhausted soil, idle sandy soils, and burned-over soils).

In 1980 the occurrence of these curculionids was indicated in 35 forest inspection jurisdictions based in various parts of the country. The most numerous occurrences and those across the relatively most significant areas were in the

Table 8. Tabulation of area of occurrence and controls for pine weevil on the territories of individual forest inspection jurisdictions in 1980

State Forest Dist. Administ. [OZLP]	Overall area of occurrence/ controls	Forest inspection jurisdiction of occurrence/control
1	2	3
Białystok	1225/571	Bielsk 30/30, Borki 7/7, Drygały 45/45, Narnee 15/15, Olecko 40/9, Pisz 18/18, Płonka 224/218, Pomorze 700/83, Supraśl 40/40, Szczebra 106/106,
Katowice	262/158	Kolonowskie 23/23, Kozegeim 32/16, Lublinice 205/117, Ustroń 2/2
Kraków	158/148	Dąbrowa Tarnowska 54/54, Buda Maleniecka 40/30, Włoszczowa 64/64
Krosno	145/145	Kolbuszowa 5/5, Narol 42/42, Tuszyma 98/98
Lublin	501/304	Buda Stalowska 177/-, Janów Lub. 120/120, Józefów 0/5, Łochów 124/124, Łuków 20/-, Parasew 49/49, Rudnik 6/6
Łódź	501/254	Dobieszyn 30/30, Grójec 71/71, Grotniki 3/3, Kozienice 71/64, Łąck 14/-, Radomsko 51/51, Spała 15/15, Wieluń 27/1, Zwoleń 19/19
Olsztyn	827/711	Iława 11/11, Kudypy 30/30, Lidzbark 22/22, Myszyniec 50/27, Ostrów Maz. 80/64, Przasnysz 210/210, Pułtusk 74/74, Srokowo 6/6, Stare Jabłonki 100/100, Strasłowo spor., Wichrowo 30/30, Wyszków 218/137
Szczecinek	58/58	Człuchów 36/36, Osusznica 22/22
Toruń	416/399	Brodnica 25/25, Czersk 52/52, Golub-Dobrzyń 50/33, Kościerzyna 140/140, Przymuszewo 37/37, Różanna 47/47, Skrwilno 30/30, Żołędowo 35/35
Total	3893/2748	58 forest inspec. jurisdictions

OZLP's of Pila, Szczecin, and Zielona Góra (Table 9).

Table 9. Tabulation of area of occurrence and controls for the curculionid weevils on the territories of the individual forest inspection jurisdictions in 1980

State Forest District Administ. [OZLP]	Overall area of occurrence/ controls	State inspection jurisdiction of occurrence/control
1	2	3
Łódź	15/15	Płock 15/15
Olsztyn	28/19	Dwukoły 15/15, Elbląg 3/-, Myszyniec 10/4, Strzałowo spor.
Piła	198/177	Potrzebowice 5/-, Sarbia 10/10, Trzcianka 163/163, Wałcz 20/4.
Poznań	76/69	Antonin 6/6, Grodzisk 32/32, Kościan 20/20, Pniewy 11/11, Wolsztyn 7/-.
Szczecin.	168/158	Bolewice 3/3, Dębno 15/5, Ośno 150/150
Toruń	73/59	Bydgoszcz 10/10, Czersk 5/2, Golub-Dobrzyń 5/-, Strzebielino 6/-, Szubin 45/45, Włocławek 2/2
Wrocław	6/6	Legnica 6/6
Zielona Góra	510/448	Białków 1/1, Krosno 150/94, Lubsko 23/23, Nowa Sól 39/39, Szprotawa 41. 44/41, Sulechów 59/59, Torzym 30/27, Wolsztyn 94/94, Zielona Góra 70/70
Szczecinek	28/21	Czaplinek 8/8, Leśny Dwór 20/13
Total	1102/972	35 forest inspec. jurisdictions

The overall area of tree fields infected by these insects in 1980 was 1,102 ha, that is, 137 ha (12%) more than in the previous year. In addition, control was carried out by contact insecticides (among others, Owadofos) across an overall area of 972 ha, that is, 267 ha (26%) more than in the previous year.

In 1981 in places where there were large-scale occurrences of the curculionids, it was suggested that chemical preparations be used. Recovery measures

should be applied promptly after determining the appearance of these curculionids, and decisions in this matter should be taken by the forest inspection jurisdictions. The forest jurisdictions required to determine the use of insecticides are the proper Forest Protection Associations and the parent organizations of the State Forest District Administrations.

8. Bark-boring beetle (Hylastes ater Payk)

This insect most frequently appears in 2-4 year pine fields, in which the young beetles carry out supplementary feeding.

In 1980 the bark-boring beetle was signalled from the OZLP Bialystok from the Suwalka forest jurisdiction, where it occurred in a pine field with an area of 83 ha.

Control was carried out throughout the entire area where this pest occurred.

9. Pine scale (Matsucoccus pini Green)

This insect makes its appearance most frequently in naturally occurring pine stands of trees in the middle and older age classes. In 1980 pine scale was discovered in the Giżycko Forest Inspection Administration (OZLP Bialystok). No control measures are taken against this pest.

10. European pine sawfly (Neodiprion sertifer Geoffr.)

This type differs in several respects among the other representatives of the Diprioninae subfamily occurring in Poland. It differs primarily from them in its manner of laying eggs for the winter, because it lays its eggs for the winter in the pine needles, whereas in related kinds, the larva are in cocoons. In addition, it differs from them in the choice of a food base, for it decidedly prefers young trees (10-20 years' growth) and older cultivated tree fields,

whereas at the same time, other types appear primarily in naturally occurring wood stands. Another specific characteristic for the European pine sawfly is its exceptional susceptibility to epizootic viruses. It may be asserted, in fact, that this is the deciding factor with regard to the fact that this type is numbered in the less threatening types of insect pests in Poland. Its increased occurrences have lasted, up to the present time, for only short periods usually, primarily for only one season, and it has encompassed only small surface areas, being restricted most often to a single tree field or a single young tree. At the present time, we are witness to certain changes, perhaps transitional ones, in the behavior of this pest. Its mass and large-scale appearances are noted now, primarily, in naturally occurring wood stands, and not only in wood stands of pole wood, but also in older wood stands, even in the age class IV group. This stage in the Zwoleń forest inspection jurisdiction (OZLP Łódź) over a considerable area, that is, an area comprising at present about 4,000 ha, has lasted already since 1979, and at the same time there are no indications of the possibility that this will be changed during the present year, which is already the third year of this large-scale occurrence, and this is a unique and unusual occurrence with regard to the European pine sawfly. Uncommon also is the fact of the simultaneous occurrence of this insect pest in many locales in different regions of the country.

In 1980 its occurrence was signalled from the following forest inspection jurisdictions:

OZLP:	Nadleśnictwa:*
Białystok	Narewa, Olecko, Pomorze, Rudka
Katowice	Kędzierzyn?, Kolonowskie, Koniecpol, Tułowice?, Turawa, Rudy Raciborskie
Kraków	Myślenice, Ruda Maleniecka, Włoszczowa,
Kresno	Kolbuszowa?,
Lublin	Biała Podlaska, Chełm?, Rudnik, Sarnaki
Łódź	Dobieszyn?, Grójec, Kolumna?, Opoczno, Piotrków, Radomsko, Wieluń, Zwoleń,
Olsztyn	Górowo Iławeckie,

*Forest inspection jurisdictions for which there was no description of the European pine sawfly are noted with question marks.

Piła	Trzcianka?,
Szczecin	Dębno Lubuskie,
Szczecinek	Człuchów?, Chojnice?,
Toruń	Szubin,

The area of occurrence was quite varied, from several hectares, to several thousand hectares (the maximum was 4,400 ha in the Zwoleń forest inspection jurisdiction). At the same time, the degree of damage to the trees was quite varied, extending inclusively to the complete destruction of old piles of conifer needles.

The methods for forecasting the European pine sawfly have not been tested up to the present time in our country, due to their previous only slight importance in Poland. For the first time in 1980, a test sampling of eggs was carried out in nine forest inspection jurisdictions according to the recommendations of IBL [Forestry Research Institute]. The result of this sample was a description of the state of threat for 1981 in the two following forest inspection jurisdictions:

- in the Kolonowskie forest inspection jurisdiction, the infestation was weak and medium, comprising all together 29 ha,
- in the Koniecpol forest inspection jurisdiction, the infestation was medium to strong, comprising all together 57 ha.

In the seven other forest inspection jurisdictions, the survey showed no infestations, in certain cases due to the fact that the sample was carried out in the spring, that is, at the time when the pine needles with the egg deposits had not yet taken on their distinctive coloring. The coloring of the location of the egg pouches begins to be visible only in the late autumn. As far as regards the European pine sawfly, there will continue to be further tendencies for large-scale occurrences across large areas, and the search for eggs should be included permanently among the methods for carrying out forecasting.

In 1981 concerted insect control efforts against the European pine sawfly

are not foreseen, mainly due to the fact of the engagement of all insect control forces and control means with the catastrophic occurrence of nun moths, and due to the fact, also, that this insect pest's (the European pine sawfly) eating is limited usually to old collections of pine needles. In the cases of critical infestation, control measures will be carried out, perhaps, with the coordination of the proper Forest Protection Association.

The IBL is planning for 1981 a series of test control measures against the European pine sawfly by means of a virus preparation ordered from Finland. As regards this order, it will be carried out for a certain restricted time period and for a surface area of 50 ha.

11. Gall midges (Thecodiplosis brachyntera Schwaegr.)

This insect prefers to attack cultivated pine tree fields with trees five to six years old.

In 1980 occurrences of the gall midge were indicated in two forest inspection jurisdictions: Tuszyma (OZLP Krosno) and Potrzebowies (OZLP Pila), where they occurred over a surface area of about 2,000 ha.

Insect control measures were not carried out.

12. Pine-shoot moth (Rhyacionis bucliana Schiff.)

This insect is one of the worst insect pests for cultivated fields of young (10-20 years) pine trees. It occurs throughout the territory of the whole country, but most frequently its large-scale occurrences take place in Western Poland.

In 1980 occurrences of the pine-shoot moth (pine-tip moth) were indicated in 17 forest inspection jurisdictions based on the territories of seven State Forestry Administrative districts (Table 10).

Table 10. Tabulation of surface area for the occurrence of the pine-shoot (pine-tip) moth on the territories of individual forest inspection jurisdictions in 1980

OZLP	Overall area of occurrence in ha	Forest inspection jurisdictions, area of occurrence in ha
1	2	3
Katowice	46	Brynek - 1, Chrzanów - 45
Lublin	30	Biłgoraj - 10, Sarnaki, Sokołów - 20
Łódź	267	Grotniki - 15, Łąck - 12, Przysucha - 40, Spała - 200
Olsztyn	75	Kwidzyń - 40, Srokowo - 35
Toruń	147	Chocenowo - 45, Gniewkowo - 7, Golub-Dobrzyń - 40, Lipusz - 55
Wrocław	140	Węgliniec - 140
Zielona Góra	21	Torzym
Total	726	17 forest inspect. jurisdict.

*State Forests District Administration

The total area of cultivated tree fields and young pine trees (10-20 years' growth) attacked by this pest amounted to 726 ha. At the same time, it made an appearance across relatively large areas in the territories of the Łódź and Toruń OZLP's.

Recovery operations were carried out in three forest inspection jurisdictions: Brynek (OZLP Katowice), for an overall area of 1 ha; Biłgoraj (OZLP Lublin), 10 ha; and in Gniewkovo (OZLP Toruń), 7 ha.

13. Pine-shoot (pine-tip) moth (Rhyacionia duplana Hb.)

In 1980, an increased occurrence of this pine-shoot (pine-tip) moth was indicated in the Dębrowa Tarnowska forest inspection jurisdiction (OZLP Kraków), where this insect occurred in cultivated fields of pine trees across an area of about 80 ha. No insect control measures were undertaken.

14. Pine-bud moth (Exoteleia dodecella L.)

This insect is a pest that attacks naturally-occurring pine stands of all age classes, most frequently in weak forest environments and in industrialized areas.

In 1980 the occurrence of the pine-bud moth was indicated in 14 forest inspection jurisdictions based on the territories of four State Forests District Administrations, and the overall forest area infested by this pest amounted to 6,123 ha (Table 11).

Table 11. Tabulation of area of occurrence and insect control measures against the pine-bud moth on the territories of individual forest inspection jurisdictions in 1980

OZLP*	Overall area of occurrence/ control measures in ha	Name of forest inspection jurisdiction, area of occurrence/insect control measures
Katowice	328/14	Kędzierzyn 10/-, Kozegeln 180/-, Rudy Racib. 47/-, Rybnik 80/-, Strzelce Op. 47/-, Zloty Potok 14/14
Lublin	430/-	Biała Podlaska 300/-, Lukow - 130/-
Łódź	5330/-	Bełchatów 4000/-, Przysucha 100/-, Spała 1000/-, Wieluń 30/-, Warszawski Zespół Leśny 200/-
Poznań	35/-	Karesma Borowa 35/-
Total	6123/14	14 forest inspect. jurisdict.

*State Forests District Administration

Insect control measures against the pine-bud moth were carried out only in the Zloty Potok forest inspection jurisdiction (OZLP Katowice), on an area of 14 ha. Foschlor with an expenditure quota of 15 l Foschlor plus 85 l of water per hectare was applied as a chemical recovery procedure. Spraying was also carried out by means of ground equipment. No insect control measures are planned for 1981.

PART II

PRIMARY INSECT PESTS FOR OLDER NATURALLY-OCCURRING TREE STANDS

a. Pine Pests

Just as in previous years, insect control measures against forest insect pests were carried out in 1980 using insecticides. In naturally-occurring pine stands in northern regions of the country, the surface area subjected to insect control measures for the nun moth amounted to 509,143 ha, and in the south control measures undertaken against the web-spinning sawfly were carried out on 209 ha; in naturally-occurring spruce tree stands control measures were taken for the larch-bud moth across an area of 6,658 ha, as well as in fir tree stands against fir moths on an area of 2,787 ha. The total inclusive surface area given over to insect control measures was 518 thousand 797 ha.

In 1981, it is foreseen that there will be further increases in infestations of naturally-occurring tree stands by primary insect pests, and particularly, by the nun moth, which will be controlled for in the northern part of the country, probably, across an area of about 1,800 thousand ha.

In addition, it is foreseen that chemical measures of insect control will also be taken up against the following insects: the web-spinning sawfly, the larch-bud moth, and the fir moth.

15. Web-spinning sawfly (Acantholyda memoralis Thoms.) (early form)

This insect has infested the Silesian forests for many years. In 1980, in addition, although it was only for small areas, it became necessary to take up recovery measures across an area comprising 209 ha total.

In 1981, a more extensive occurrence of the web-spinning sawfly is foreseen

for the territories of the OZLP Katowice and the OZLP Toruń in five forest inspection jurisdictions, for a total surface area of 313 ha (Table 12). In comparison with the previous year, the area of wood stands infested increased by 137 ha, that is, by about 40%.

In the future, this pest will persist primarily in its older and previous gradation centers in the northern part of the country, as well as in its newly appearing gradation center in the Lipusz forest inspection jurisdiction. A precautionary state exists also in the Brynek and Turawa forest inspection jurisdictions (OZLP Katowice).

It should also be mentioned that this pest, outside its gradation regions, does not constitute a threat requiring chemical means intervention; however, the size of the drip-zone area, upon which larger numbers of the larvae are found, is systematically increasing.

On infested territories, larvae with false eyes amount to 73 to 100%, and the maximum number of larvae on a drip-zone area is 1,060 specimens (the Rudy Raciborskie forest inspection jurisdiction).

Table 12. Tabulation of surface area of naturally-occurring pine stands infested by the web-spinning sawfly (early form) in 1981

State Forests District Adminis. [OZLP]	Forest inspection jurisdiction	Degree of wood stand infestation			
		weak /+/	medium /++/	strong /+++/	Over-all
		Area in ha			
Katowice	Brynek	12	-	-	12
	Kup	10	19	30	59
	Rudy Raciborskie	110	12	58	180
	Turawa	5	-	-	5
Toruń	Lipusz	57	-	-	57
Total		194	31	88	313

Parasitoidism of the larva is sporadic, and occurs only in the Rudy Raciborskie forest inspection jurisdiction at a level of about 5%.

In 1981, it is expected that chemical recovery measures will be undertaken across a surface area of about 120 ha.

The late form of the web-spinning sawfly in 1981 should pose no threat.

16. The sawflies (Diprionidae)

In 1980, in many forest inspection jurisdictions in different parts of the country, the European pine sawfly made an appearance in naturally-occurring tree stands of different ages, including age class IV. We have already discussed, however, the situation as regards this type in the section devoted to pests harmful to cultivated tree fields and young trees (10-20 years' growth), where it is traditionally found. The considerations presented here relate to other kinds of sawflies, whose normal occurrence sites are wood stands of other and higher age class trees.

After the insect control measures carried out in 1978, sawflies connected with pine tree stands have not shown any increasing gradation tendencies. A weak threat (+) was foreseen for the year 1980 from the pine sawfly in the Grodziec forest inspection jurisdiction (OZLP Poznań), across an area of 25 ha. In addition to this, there were indications for the need of vigilance in 10 forest inspection jurisdictions in three of the northern OZLP's (in Bialystok, two jurisdictions, Olsztyn, one jurisdiction, and in Toruń, seven jurisdictions). Sawflies made no appearance to any of these forest inspection jurisdictions during the vegetation period of 1980 in any extent requiring intervention, including also the forest inspection jurisdiction of Grodziec. At the same time, as well, in the new centers that had been indicated over the period of 1980 for the appearance of sawflies, the numbers of these pests did not present an overall threat for the naturally-occurring wood stands.

Information on the sites of sawfly occurrence come, for the main part, from the flag and report cards, for which one of the main faults is a lack of identifying the insect type. It was only in a few cases that it was possible to signify the insect type, relying on the evidential material forwarded.

As a result, thus, the pine sawfly was confirmed in the Sieradz forest inspection jurisdiction (OZLP Lódź) and the Grodziec jurisdiction (Poznań), as well as in Rudnik jurisdiction (Lublin), where there was an occurrence, in addition to the occurrence of the European pine sawfly (Pol. "borecznik rudy," Neodiprion sertifer Geoffr.). In addition, the European pine sawfly was accompanied by the pine sawfly in not great numbers in the following forest inspection jurisdictions: Kolonowskie and Koniecpol (Katowice), as well as in Zwoleń (Lódź). Materials from the Antonin and Przedborów jurisdictions (Poznań) indicated the occurrence of several types, among which the most frequent was the shrub sawfly (Pol. "borecznik krzewian"). In the Konin and Kościan jurisdictions (Poznań) according to indications from the ZOL [Forest Protection Association] in Krzyż, the types of Gilpinia laricis and G. variegata were also supposed to have predominated. In the following forest inspection jurisdictions, no descriptions were afforded the occurrence of any type of sawfly, despite the fact that certain indications showed that it would have been possible that there would have been cases of the European pine sawfly: Kędzierzyn and Tulowice (OZLP Katowice), Kolbuszowa (Krosno), Chelm (Lublin), Dobieszyn and Kolumna (Lódź), Trzcianka (Pila), and Czluchów and Osusznica (Szczecimek).

In the autumn surveys of 1980, there was discovered, nevertheless, an increased occurrence of the shrub sawfly in the Milicz jurisdiction (Wroclaw) although it constituted no threat.

The Forest Protection Association in Gdańsk confirmed in its materials from its autumn surveys increased numbers of sawfly cocoons in the following forest inspection jurisdictions: Szczebra (Bialystok), Kwidzyń (Olsztyn), as well as in Cierpiszewo and Tuchola (Toruń). The types of sawfly were not described.

Considering the great rapidity in the development of gradation processes in sawflies, all the forest inspection jurisdictions in which the appearance of these pests were registered in 1980 were required to include the centers of the occurrence in their control check.

17. The pine beau (Panolis flammea Schiff.)

During the insect control operation against the pine beau in the years 1978 and 1979, there was a very strong thinning out of their population. In addition, the measures applied in 1980 against the nun moth on the territories where the pine beau occurred resulted in a further reduction in its population.

An analysis of the autumn surveys of pine pests showed that there were only pupae in the duff on the drip-zone areas.

The viability for this pest was very low, not exceeding 15-20%.

In 1981, it is expected that there will be an occurrence of the pine beau only to a weak extent (+) on the territory of the Strzalowo forest inspection jurisdiction (OZLP Olsztyn), for an overall area of 12 ha, and in the Kościerzyna jurisdiction (OZLP Toruń), for 8 ha.

There are no insect control measures being carried out during the present year.

18. The bordered white beauty (Bupalis piniarius L.)

For several years, particularly on the territories of the northern regions, a variation in the population density of the bordered white beauty has been observed. In 1980, it was expected that there would be chemical control against this pest over an area of about 500 ha; however, this was done during the spring season, and in subsequent years, checks indicated that as a result of the effects of abiotic factors and biotic factors, there was a numerical reduction in this

pest, and this made it possible to exclude previously threatened tree stands from the chemical restoration measures.

In 1981, on the basis of analyses of materials from autumn samples undertaken of pine pests, increased occurrences of the bordered white beauty were forecast for 10 forest inspection jurisdictions and in the Woliński National Park on an overall area of 352 ha (Table 13).

Table 13. Tabulation of surface area of pine tree stands threatened by the bordered white beauty in 1981

State Forests District Adminis. [OZLP]	Forest inspection jurisdict.	Degree of threat to tree stands			
		weak /+/	medium /++/	strong /+++/	Overall
		Area in ha			
Białystok	Augustów	6	-	-	6
Katowice	Tułowice	13	-	-	13
Olsztyn	Elbląg	9	-	-	9
Poznań	Przedborów	-	33	-	33
Szczecinek	Sławno	43	17	-	60
Toruń	Chocszewo	98	21	7	126
	Lipusz	2	-	-	2
	Strzebielino	28	-	-	28
	Wejherowo	45	9	15	69
Wrocław	Ruszów	6	-	-	6
Others	Woliński PN	-	1	-	1
Total		249	81	22	352

In comparison with the previous year, the area was reduced by 2,369 ha, that is, by about 85%. The viability of this pest is relatively high. The cautionary numbers of this insect were exceeded in the following forest inspection jurisdictions: Kup (OZLP Katowice); Chocianów, Grochowo, and Legnica (OZLP Wroclaw); Szprotawa (OZLP Zielona Góra); Bilgoraj, Józefów, and Rudnik (OZLP Lublin); Gostynin, Opoczno, Przysucha, Poddębice, and Spala (OZLP Łódź); Barycz, Lagów, Pińczów, and Starachowice (OZLP Kraków); Augustów, Maskulińskie, Plaska, Suwalki, and Szczebra (OZLP Bialystok); Spychowo and Wyszków (OZLP Olsztyn); Kartuzy,

Kościerzyna, Strzebielino, and Wejcherowo (OZLP Toruń).

In the present year, it will be necessary to carry out supplementary spring and summer observations for the bordered white beauty.

19. The pine lappet moth (Dendrolimus pini L.)

During the analysis of the results of the autumn pine pest surveys, there was nowhere confirmed any increased occurrence of the pine lappet moth; however, during the territorial inspections, there were found unusual numbers of the caterpillars of this pest on the territory of the Toruń OZLP.

In 1981, it is not expected that there will be any chemical control for pine lappet moths; however, this pest requires careful observation during the spring, especially in the northern and western territories of the country.

20. The nun moth (Lymantria monacha L.)

For four years the nun moth has occurred in the pine woods of Northern Poland in an intensity and over a wide surface area never before noted in the history of our forestry.

In 1980, chemical recovery measures were undertaken in 82 forest inspection jurisdictions based on the territories of eight State Forests District Administrations. The overall area encompassed within these measures amounted to 509,143 ha. The imported preparation of British manufacture, with the trade name Ambusz 258 C, was used in the insect control project; it contains as its active substance the synthetic pyrethrum, Permetryna. One hundred ml of this preparation, mixed with two or five l of fuel oil, is used for one hectare, depending on the type of equipment mounted on the airplane. A preparation of home production was also used in the operation, with the trade name "Mgławik Ekstra," containing metoxychloride and propoxyurea as the active ingredients. The usage norms for

this preparation are about 10 l/ha.

The chemical restoration measures began on 31 May, and ended on 27 June. During the period of the operation, 55 aircraft of the AN-2 type were in operation, as well as five Mi-2 helicopters. The control operation was also carried out in several cultivation fields, where the nun moth had been carried by wind. Owadofos was used there in the insect control operation, as well as other insecticides, and the spraying was carried out with the use of motorized land equipment. In general, high mortality in the caterpillars was observed in the Ambusz application sites, while "Mgławik Ekstra" yielded less satisfactory results, and in some of the forest inspection jurisdictions, there even arose the necessity for repeated sprayings.

The great differences in the effects achieved from the operation were caused by many factors, among which the most important are the following:

(a) the imperfect, and sometimes uncontrolled apparatus on the aircraft, as well as the seemingly imperfect flying techniques, which were the reason for irregularities in covering the tree stands with the preparations;

(b) the impaired effectiveness of the home-produced preparation "Mgławik Ekstra";

(c) the lack of application of Ambusz on strips with widths of 500 m in wood stands surrounding lakes and rivers (in accordance with the requirements of the health authorites). A portion of these wood stands (about 2,000 ha) was treated with biopreparations. In the wood stands not treated with pesticides or biopreparations, the nun moth caused great damage. These territories became the center of the dispersion flight of this pest to considerable distances;

(d) in many forest inspection jurisdictions, the numbers of nun moths exceeded by many times the critical numbers; it was not uncommon to find several tens of thousands of caterpillars on one tree. In these cases, the incomplete mortality of the caterpillars, although it was so great as to reach about 95%, had the result that a portion of the population numbering still several hundreds of individuals remained alive, the tree crowns were exposed, and for following periods of time serious threat was posed to the tree stands.

During the conference which was held on 18 September 1980 in the Forestry Research Institute with the participation of representatives from the State Forests District Administrations, the Forest Protection Associations, the Chief Administration of State Forests, and the Forestry Research Institute, the land area of the naturally-occurring tree stands threatened by the nun moth was determined. It was forecast that in 1981 the nun moth would occur in 162 forest inspection jurisdictions based in nine State Forests District Administrations, over an overall area of 1,730,785 ha, including a strong threat over 1,246,550 ha, a medium threat to 253,745 ha, and a weak threat to 230,490 ha (Table 14).

In comparison with the previous year, the area of tree stands targeted for chemical protection increased by three times. The most threatened were the tree stands in the Pila OZLP (98% of the overall forest covering of this District), Toruń OZLP (70%), Szczenik (60%), and Olsztyn (41%). Great intensity in the occurrence of this insect took place also in the Szczecin OZLP and in Poznań, and markedly less in OZLP Bialystok, Lódź, and in Zielona Góra. There was a shift in the gradation territories towards the west and the northwest (for example, the Poznań territories and the Zielona Góra territories).

In addition to this, occurrences in a cautionary degree were confirmed in several forest inspection jurisdictions in the Lublin OZLP (for example, in the jurisdictions of Bilgoraj, Buda Stalowska, Józefów, Lochów, Rozwadów, Rudnik).

Table 14. Overall tabulation of area of tree stands threatened by the nun moth on the territories of individual State Forests Distict Administrations in 1981

Item No.	OZLP [State Forests District Admin.]	No. of threatened forest jurisdic.	Degree of threat to tree stands			
			weak /+/	medium /++/	strong /+++/	Overall
			Area in ha			
1	Białystok	15	10 330	5 875	13 955	30 160
2	Łódź	4	2 235	1 575	9 550	13 360
3	Olsztyn	34	96 270	84 785	133 370	314 425
4	Piła	15	1 980	10 280	305 055	317 315
5	Poznań	12	13 480	15 820	34 765	64 065
6	Szczecin	23	22 110	28 785	82 365	133 260
7	Szczecinek	22	31 850	60 215	272 050	364 115
8	Toruń	33	80 345	45 625	394 945	490 915
9	Zielona Góra	4	1 595	560	270	2 425
10	Other administ.		295	225	225	745
	Total	162	230 490	253 745	1 246 560	1 730 785

The moth flight in 1980, in comparison with 1979, was quite intensive. It was also observed in deciduous tree stands, as well as outside the forest in afforested sections visible from the road, and even in larger populated areas and some cities.

From the materials analyzed that were gathered by the forest inspection jurisdictions and forwarded to the Forest Protection Associations, as well as from observations carried out by workers in the Forestry Research Institute and the Societies of the OL [Regional Forests], it appears that in many naturally-occurring stands, the number of moths alighting on a single tree exceeded by several times the control critical numbers. The numerical sex ratio in 1980 was on the average 1:1. Their numbers in the abdomens of females varied between 30 and 260 individuals, on the average, that is, of about 90 individuals, which is about 30% less than in the previous year.

In most forest inspection jurisdictions, the number of complex eggs of the nun moth exceed the critical values by several times. For example, it is suggested that the numbers of eggs selected up to 2 m height on single, standing

trees amount to the following: in the Szczenic OZLP from 100 to 13,000 pieces, in Pila 100 to 11,500 pieces, Szczecin 50-8,200, Toruń 300-4,000, Poznań 50-1,200 Olsztyn 200-900, Lódź 20-850, Zielona Góra 10-450, and Bialystok about 200.

Egg deposits found were, in fact, on all types of trees growing in the tree stands, even on smooth-barked deciduous trees; egg deposits were also encountered on underbrush and brushwood, as well as on undergrowth plants.

The vitality of this pest in the egg stage continues to be very high, varying between the values of 70 to 100%. It is only in several forest inspection jurisdictions (for example, Gostynin, Pomorze, Kudypy, Nowe Ramuki, Dobrzejewice) that the vitality was lower, amounting to 10 to 60%.

In 1980, increased effects of natural factors against this pest insect were observed. In places, large dieoffs, among other things, were noted, and tardigrade bacteria were confirmed in their bodies. In dead caterpillars collected from several forest inspection jurisdictions, there were also discovered granules of the virus that causes an apical malady, also called granuloma (apical granuloma). In addition, larva that are parasites of tachina flies and their caterpillars were found in the dead bodies of the caterpillars (for instance, about 40% in the Gostynin forest inspection jurisdiction). Certain types of predators were found in significant numbers locally, such as stinkbugs (shieldbugs) (Troilus luridus) or snakeflies (Raphidioptera) (for example, in the forest jurisdictions of Gostynin, Osie, and Zamrzenica).

It is expected that the necessity will arise in 1980 for carrying out chemical recovery operations in naturally-occurring pine tree stands over an area of about 1,800,000 ha.

Scientists from various scientific centers, during a conference dedicated to this problem on 16 October 1980, as well as participants in an international meeting attended by entomologists from Czechoslovakia, East Germany, and the

Soviet Union, which was held on 18-21 November 1980, were in favor of the necessity for continuing chemical control operations against the nun moth.

As regards the economics of the matter, imported contact insecticides from the pyrethum group will be used in the chemical measures against the nun moth; these have the following trade names: Ambusz 258C, Decis, and Ripcord, mixed in appropriate measures with fuel oil. In addition, within the framework of experimentation, on the territory of the OZLP Pila, other imported preparations will also be used, and on the OZLP Olsztyn, a biopreparation (Bactospeine).

The spraying of threatened naturally-occurring wood stands will be carried out with the use of airplanes and helicopters. A portion of the airplanes will be equipped with atomizers, which will make it possible to reduce the consumption of the working liquid by 2 l/ha. The rest of the airplanes will use 5-6 l/ha during the operation.

In those naturally-occurring pine wood stands where the nun moth population density is very high (exceeding the critical numbers by many times), it will be necessary to take account of the necessity for carrying out the operation two times. This will also be true for the older spruce tree stands. In addition, on the territories of the Olsztyn and Szczecinek OZLP's, it is expected that tests will be carried out in control measures against the nun moth in spruce wood stands using dust preparations, which can be very useful in spraying in connection with better penetration of these insecticides into the tree bark. These tests will be carried out using Gamakarbatoks and Owadofos dust preparations, with use levels of about 30 kg/ha.

It will be necessary to carry out supplementary observations in the wood stands with respect to the numbers of nun moth caterpillars during the spring of 1981 throughout all the threatened territories, as well as for the purpose of confirming whether or not there has been any reduction in the population recently as a result of the effect of biotic factors or abiotic factors. These

observations should be carried out on marked trees, or else by means of control hatching accumulations.

It is recommended that dead trees be removed as early as possible from the forests, particularly spruce trees in which nun moth egg accumulations are found in cracks in the bark.

Eight Scientific Protection Stations will be organized for the period of the control measures against the nun moth. These stations will be located in the following forest inspection jurisdictions: Osie, OZLP Toruń; Trzcianka, OZLP Pila; Nidzica, OZLP Olsztyn; Drawno, OZLP Szczecin; Szczecinek, OZLP Szczecinek; (illeg.) Sieraków, for the OZLP Poznań and Zielona Góra; (illeg.) Szeroki Bór, OZLP Bialystok; and Łęck, OZLP Lódź.

In addition, it has been suggested to set up two to five observation points for the above-named OZLP territories, making this a total of about 30 observation points.

21. Flat bugs (Aradus cinnamoneus Panz.)

This insect attacks young pine trees (10-20 years) growing in weak forest environments. The common form is also attested in regions that have been subjected to smoke by industrial plants.

In 1980, the occurrence of flat bugs was indicated in four forest inspection jurisdictions based on the territories of three OZLP's and on an overall area of 220 ha, including the Biala Podlaska forest inspection jurisdiction in the OZLP Lublin, for an area of 100 ha, and in the Luków forest inspection jurisdiction in the same OZLP, for 70 ha; the Dobieszyn forest inspection jurisdiction in the Lódź OZLP, 10 ha; the Srokowo forest inspection jurisdiction in the Olsztyn OZLP, 40 ha.

No insect control measures were carried out.

Table 15. Overall tabulation of area of tree stands threatened by the nun moth on the territories of individual provinces in 1980

Item No.	State Forests District Administration	No. of threatened FIJ*	Deg. threat to tree stands				Area of threatened tree stands in %
			weak	medium	strong	Overall	
			surface in ha				
1	2	3	4	5	6	7	8
	BIAŁYSTOK						4 %
1.	Białystockie	1	25	-	-	25	-
2.	Łomżyńskie	3	3 060	3 300	3 600	9 960	7
3.	Suwalskie	11	7 450	3 425	10 325	21 200	7
	All together	15	10 330	6 975	13 965	30 190	
	LUBLIN						2 %
4.	Płockie	3	3 100	1 000	9 000	13 100	22
5	Siedleckie	1	55	75	50	180	-
6	Siedleckie	0+1	20	-	-	20	-
	All together	4+1	3 255	1 075	9 050	13 300	
	OLSZTYN						41 %
7	Ciechanowskie	5	5 075	9 305	26 400	41 280	69
8	Elbląskie	6	15 720	13 510	38 015	67 245	58
9	Olsztyńskie	18	61 905	95 750	72 290	179 535	60
10	Ostrołęckie	5	23 470	5 220	8 675	36 365	18
	All together	34	96 370	84 785	133 370	314 425	
	PŁA						98 %
11	Pilskie	15	1 980	10 200	305 035	317 315	98
	POZNAŃ						14 %
12	Poznańskie	7	10 265	14 100	30 810	55 175	34
13	Kaliskie	2	1 600	855	535	3 000	2
14	Konińskie	1	705	510	805	1 020	3
15	Leszczyńskie	2	830	385	125	1 320	1
	All together	12	13 400	15 850	34 705	64 955	
	SZCZECIN						21 %
16	Gorzowskie	14	14 965	22 300	78 105	116 410	21
17	Szczecińskie	9	7 345	5 605	6 200	18 850	7
	All together	20	22 110	28 705	82 305	133 260	
	SZCZECINEK						60 %
18.	Koszalińskie	13	17 920	20 800	121 136	177 736	57
19	Słupskie	10+1	15 106	39 600	141 140	197 106	61
	All together	23+1	33 125	60 440	275 275	304 840	
	TORUŃ						70 %
20	Bydgoskie	15	9 780	17 435	250 260	295 475	80
21	Olsztyńskie	11	26 970	14 215	84 120	125 405	31
22	Toruńskie	5	7 535	7 005	60 075	80 205	90
23	Włocławskie	2	5 000	6 900	13 000	25 750	45
	All together	33	50 240	45 525	304 945	400 916	
	ZIELONA GÓRA						0,8
24	Zielonogórskie	4	1 005	600	370	2 485	1
		168+8	220 490	268 740	1 240 880	1 730 705	28 %

FIJ = forest inspection jurisdictions

*number of forest inspection jurisdictions + number of National Parks

Table 16. Tabulation of area of tree stands threatened by the nun moth in 1980 (according to forest inspection jurisdictions)

Item No.	OZLP [State Forest District Administration] province	Deg. threat to tree stands				Liability in %
		weak (+)	medium (++)	strong (+++)	overall	
		surface in ha				
1	2	3	4	5	6	7
	BIAŁYSTOK					
1.	Augustów	125	75	75	275	95
2	Bielsk	25	-	-	25	
3	Borki	75	-	-	75	
4	Drygały	750	25	-	775	
5	Ełk	100	-	-	100	
6	Giżycko	975	-	-	975	
7	Głęboki Bród	100	-	-	100	
8	Mieckalidzkie	1900	1750	4560	8210	84-90
9	Nowogród	2330	2230	1800	6360	95
10	Olecko	175	75	25	275	
11	Pisz	1750	1420	5620	8790	90-100
12	Pomorze	250	150	25	425	40
13	Rajgród	150	150	1650	2150	96-99
14	Szczebra	1250	-	-	1250	
15	Trzciannе	375	-	-	375	
All together		10 330	6 875	13 955	30 160	
	ŁÓDŹ					
1	Gostynin	1000	500	7000	8500	10-90
2	Łąck	300	220	-	520	
3	Płock	880	780	2500	4160	81-93
4	Sierads	55	75	50	180	83
	All together	2235	1575	9550	13360	
	Olsztyn					
1	Bartoszyce	1760	1890	700	4350	
2	Ciechanów	2040	3300	300	5640	90
3	Debrecin	1850	500	125	2475	90-100
4	Dwukoły	445	1100	7400	8945	70-95
5	Elbląg	1035	1455	300	2790	100
6	Górowo Iław.	1060	2150	2295	5505	100
7	Iława	490	3160	9780	13430	80-95
8	Jedwabno	2165	4030	9475	15670	70-95

1	2	3	4	5	6	7
9	Kudypy	5500	2150	450	8100	55
10	Kwidzyń	500	2850	15600	18950	90
11	Lidzbark	35	2160	17965	20160	90-95
12	Miłomłyn	7875	1470	605	9950	80-95
13	Młynary	2350	1600	150	4100	80-95
14	Mrągowo	210	570	990	1770	95
15	Myszyniec	6395	1415	1030	8840	95
16	Nidzica	4100	5000	4750	13850	95-100
17	Nowe Ramuki	3635	4300	11505	19340	85-94
18	Olsztynek	3435	2200	1745	7380	90-95
19	Ostrołęka	4760	1000	400	6160	60-100
20	Ostrów Maz.	1855	10	-	1865	
21	Płońsk	1405	1845	635	3885	90-95
22	Przasnysz	9460	3795	5245	18500	90-95
23	Pułtusk	1650	900	100	2650	95
24	Szydłowo	5500	5100	6800	17400	70-95
25	Szrokowo	105	-	-	105	
26	Stare Jabłonki	5690	3035	360	9085	95
27	Strzałowo	1075	1400	1525	4000	78-94
28	Susz	1715	3860	8995	14570	70-95
29	Szczytno	4170	7100	8895	20165	75-92
30	Wichrowo	3785	5895	2040	11720	95
31	Wielbark	4135	5610	7260	17005	95
32	Wipsowo	2940	1660	3585	8185	95
33	Wysoków	1000	-	-	1000	
34	Zaporowo	2245	2275	2365	6885	95
	All together	96270	84785	133370	314425	
	PIŁA					
1.	Człopa	180	540	26580	27300	93-98
2	Durowo	145	1130	7595	8870	91-99
3	Jastrowie	40	980	21395	22395	81-98
4	Krzyż	55	210	18325	18590	92-99
5	Mirosławiec	-	80	24005	24085	95-98
6	Okonek	-	985	18280	19265	92-100
7	Podanin	170	535	17245	17950	97-98
8	Potrzebowice	-	565	30150	30715	93-98
9	Sarbia	560	1285	21040	22885	91-99

1	2	3	4	5	6	7
	PILA					
10.	Trzcianka	-	145	19380	19525	94-98
11.	Wałcz	-	45	25405	25450	95-99
12	Wronki	-	205	21945	22150	89-99
13.	Wyrzysk	545	2190	15290	18025	95-98 /83/
14	Zdrojowa Góra	60	595	17675	18330	88-99
15	Złotów	225	840	20745	21810	94-97
	All together	1980	10280	305055	317315	
	POZNAŃ					
1.	Babki	750	590	115	1455	85-97
2	Gniezno	2670	3365	2525	8560	91-99
3	Grodziec	1510	795	235	2540	97-98
4	Grodzisk	1910	1785	780	4475	68-97
5	Jarocin	90	60	-	150	89
6	Kaszuny Ber.	280	160	30	470	
7	Konin	785	510	585	1880	71-85
8	Konstantynowo	1235	1470	385	3090	
9	Kościan	550	195	105	850	
10	Łęczychówko	935	1390	1625	3950	94-98
11	Oborniki	1345	2980	13200	17525	90-99
12	Paiewy	1420	2520	15180	19120	86-99
	All together	13480	15820	34765	64065	
	SZCZECIN					
1.	Berlinek	595	470	55	1120	93-100
2	Bierzwnik	1295	3550	7190	12035	94-99
3	Bogdaniec	50	30	-	80	
4	Bolewice	1655	985	60	2700	95-99
5	Chojna	175	35	-	210	95-98
6	Dobrzany	650	1160	540	2350	87-99
7	Drawno	285	2305	16130	18720	96
8	Głusko	280	1050	14355	15685	87-100
9	Goleniów	350	295	80	725	83-88
10	Gryfino	115	160	-	275	
11	Karwin	115	1035	23820	24970	95-99
12	Klinisko	2090	690	30	2810	97-98

1	2	3	4	5	6	7
13	Kłodawa	4905	2160	240	7305	97-99
14	Lubsz	1410	1790	3295	6495	95-99
15	Mieszkowice	355	20	25	400	85-97
16	Międzychód	1585	5560	6950	14095	
17	Myślibórz	195	240	-	435	97-99
18	Ośno Lub.	175	-	-	175	95-98
19	Reske	870	1255	230	2355	90-99
20	Rokita	1230	-	-	1230	
21	Skwierzyna	1790	180	30	2000	87-100
22	Smolarz	1000	5815	9335	16240	84-100
23	Trzciel	850	-	-	850	93-100
	All together	22110	28785	82365	133260	
	SZCZECINEK					
1.	Białogard	4295	5030	3815	13140	81-99
2	Bobolice	4115	6270	5630	16015	95-99
3	Bytów	1235	4850	21920	28005	94-99
4	Czaplinek	145	540	23445	24130	91-95
5	Czarne	125	440	23190	23755	87-100
6	Człuchów	25	105	19580	19710	95-99
7	Drawsko	75	1985	28165	30225	95-98
8	Drezdenko	585	4060	24650	29295	88
9	Gościno	500	130	1895	2525	97
10	Leśny Dwór	4085	6230	8715	19030	98-100
11	Lębork	1125	1195	160	2680	94-98
12	Manowo	2475	3235	1965	7675	91-99
13	Miastko	340	1010	13050	14400	95-99
14	Międzywiady	1565	4755	10925	17245	88-94
15	Osusznica	275	2095	19385	21755	86-91
16	Połczyn	470	2510	9400	12380	97-99
17	Sławno	1365	2500	1255	5120	91-100
18	Smeczeinek	25	380	15875	16280	94-99
19	Świdwin	3045	3300	3155	9500	92-99
20	Ustka	2430	1300	280	3910	80-100
21	Wałcz	3380	5605	12110	20995	93-99
22	Złocieniec	90	2490	23185	25765	94-100
	Communal forests & State fish farms	90	200	300	590	93
	All together	31880	60215	279060	364115	

1	2	3	4	5	6	7
	TORUŃ					
1.	Brodnica	3675	2235	10525	16435	80
2	Bydgoszcz	-	-	20000	20000	70-95
3	Chocszewo	50	-	-	50	90-100
4	Cierpiszewo	-	-	19500	19500	90-95
5	Czersk	-	1300	16900	20200	94-97
6	Dąbrowa		1575	22500	24075	80-95
7	Dobrzejewice	1900	1900	18700	22500	60-98
8	Gdańsk	1100	450	200	1750	95
9	Gniewkowo	400	600	11500	12500	97-99
10	Golub-Dobrzyń	250	1350	9800	11400	80-95
11	Gołąbki	2050	1075	8950	12075	90-95
12	Jamy	1700	1600	10150	13450	80-95
13	Kalisz	1200	1700	15700	18600	90-98
14	Kartuzy	3050	1150	5225	9425	70-95
15	Kolbudy	3250	1850	2250	7350	60-95
16	Kodzierzyna	4600	3475	13500	21575	70-95
17	Lipusz	1100	800	14945	16845	90-95
18	Lubichowo	3500	1500	23100	28100	95
19	Mirosz	1000	1050	550	2600	95
20	Osie	1500	2600	19700	23800	90-95
21	Przymuszewo	500	550	16000	17050	70-95
22	Różanna	-	-	9500	9500	80-95
23	Runowo	100	550	16000	16650	78-98
24	Rytel	1050	1000	17050	19100	70-95
25	Skrwilno	2500	3000	3250	8750	70-95
26	Starogard	4400	2950	9150	16500	95
	TORUŃ					
27.	Strzebieliino	2200	200	50	2450	60-95
28	Szubin	1050	4625	16750	22425	75-97
29	Tuchola	1000	1000	19000	21000	95
30	Tujherowo	620	140	-	760	100
31	Włocławek	5500	3900	10600	20000	92-97
32	Zamrzenica	1100	800	16000	17900	95
33	Żołędowo	-	700	15900	16600	80-95
	All together	50345	45625	394945	490915	

1	2	3	4	5	6	7
	ZIELONA GÓRA					
1.	Kreano	60	-	-	60	97
2	Świebodzin	130	-	-	130	
3	Torzym	150	35	-	185	96
4	Wolsztyn	1255	525	270	2050	90-96
	All together	1595	560	270	2425	
	INNE ADM.					
1.	Kampinowski PN	20	-	-	20	
2.	Słowiński PN	275	225	225	725	

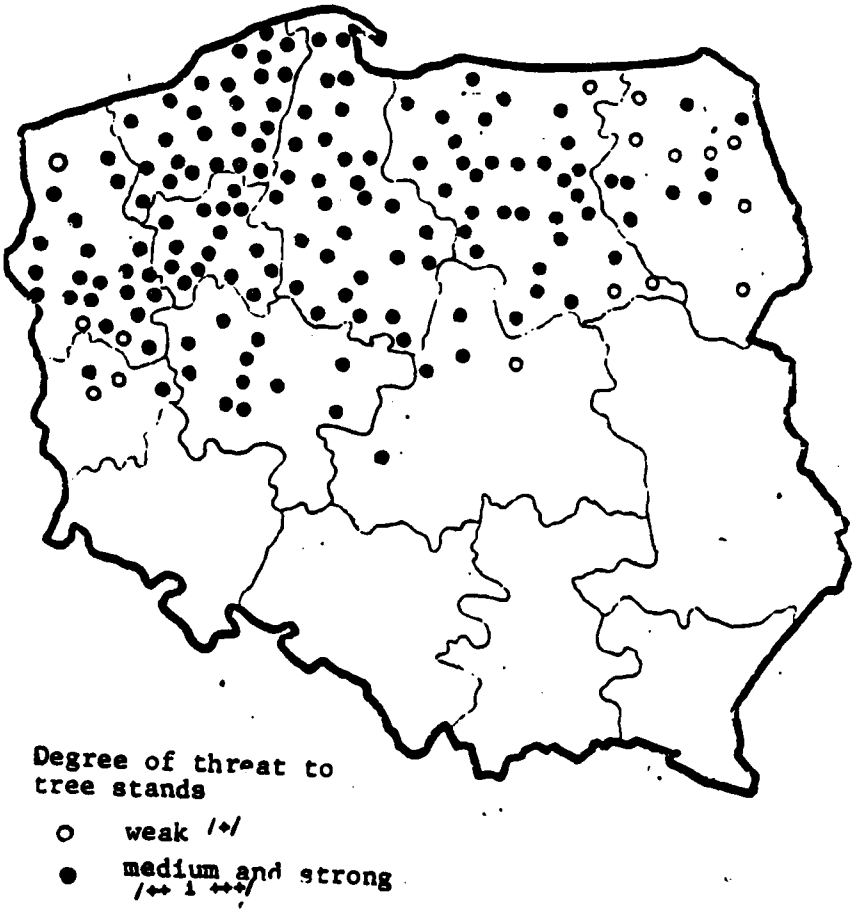

Fig. 2. Forecast occurrence of the nun moth in 1981.

b. Insect Pests for Other Types of Conifer Trees

22. The larch-bud moth (Zeiraphera griseana-diniana)

In 1980, there was an increased and large-scale occurrence of the larch-bud moth, particularly in the border region in two gradation centers; one was on the territory of the Wroclaw OZLP (Góry Izerskie, Karkonozse, Góry Kamienne), and the other was in the Katowice OZLP (Beskid Żywiecki). This insect caused serious damage to spruce tree stands over an area of about 30,000 ha (Table 17).

Table 17. Tabulation of area of spruce tree stands damaged by the feeding of the larch-bud moth in 1980

State Forests District Administ. [OZLP]	Forest inspection jurisdiction	Deg. damage to tree stands			
		Light feeding in %	Medium feeding 31-60 %	Heavy feeding 60 %	Over-all
		Area in ha			
Wrocław	Kamienna Góra	2611	1162	753	4416
	Szklarska Poręba	3469	4061	2334	9864
	Śnieżka	5107	690	-	5797
	Świeradów	2985	2385	802	6172
	Wałbrzych	128	-	-	128
	Karkonoski PN	1632	843	836	3211
Katowice	Jeleśnia	268	-	-	268
	Ujsoły	29	-	-	29
	Węgierska Górka	119	-	-	119
Total		16148	9131	4725	30004

The larch-bud moth also occurred on the other side of the border, in neighboring Czechoslovakia, in similar intensities, but across a considerably larger area.

Th chemical insect control measures for this insect were carried out in 1980 across a total area of 6,658 ha (the Kamienna Góra forest inspection jurisdiction, 938 ha; Szklarska Poręba, 1,139 ha; Śnieżka, 111 ha; and Świeradów,

4,470 ha). The following preparations were used: Actelic 50EC across a total area of 4,886 ha; Mgławik R-avia, 1,386 ha; and Ambusz 25EC, 384 ha. In Czechoslovakia insect control measures were carried out over a total area of about 46,000 ha.

The recovery operations were initiated on 5 June, and finished on 7 July 1980. The results of the operation carried out were satisfactory. Despite this, in relation to the previous year, there was a 30% increase in the area of tree stands subjected to feeding on the territory of the Wroclaw OZLP.

In addition, there was a marked shift in gradation in the northerly and easterly directions.

In the other occurrence locale for the larch-bud moth, on the territory of the Katowice OZLP, the area of naturally-occurring spruce stands encompassed by the feeding decreased significantly in comparison with the previous year, and the feeding here was only weak. This indicates a gradual termination of the gradation across this territory.

On the territory of the Wroclaw OZLP, further increases in the area of tree stands subjected to the feeding of the larch-bug moth larvae were forecast for 1981, as well as the necessity for carrying out chemical restoration measures on an area of about 7,000 ha. The remaining area of tree stands designated for insect control measures will be established after the completion of analyses and the acquisition of photoecological data from the silviculture.

Naturally-occurring tree stands, in which the feeding of the larch-bud moth persists for several years, require particular attention with respect to the possibilities of there being a large-scale reproduction of secondary pests.

23. The web-spinning spruce sawfly (Cephalcia sp.)

This pest primarily attacks spruce stands, particularly those consisting

of trees of the same age and the same type, growing primarily in mountainous territories.

In 1978 the following forest inspection jurisdictions in the Kraków OZLP were included in this insect's feeding: Limanowa, Krościenko, Piwniczna, and Stary Sącz, and in the Katowice OZLP, Bielsko, Ustroń, and Węgierska Górka, for a total area of about 2,000 ha.

The intensity of the sawfly feeding for the rest of the year was weaker than in 1979. Beneficial atmospheric conditions made it possible for the tree stands to partially regenerate their lost needles.

Controlled surveys of the sawfly larvae indicated a threat over a total area of 1,168 ha (Table 18).

Table 18. Tabulation of area of spruce tree stands threatened by the feeding of the web-spinning spruce sawfly in 1981

State Forests District Adminis. [OZLP]	Forest inspection jurisdiction	Deg. threat to tree stands			
		weak /+/	medium /++/	strong /+++/	Over-all
		Area in ha			
Katowice	Bielsko	33	-	-	33
	Ustroń	55	43	-	98
	Węgierska Górka	14	-	-	14
	Wisła	40	4	101	145
Kraków	Krościenko	28	17	-	45
	Piwniczna	34	24	14	72
	Gorczański PN	229	137	397	763
Total		432	225	512	1169

The maximum number of larvae was found in the Wisla forest inspection jurisdiction, amounting to 750 individuals per square meter. In the rest of the forest inspection jurisdictions, 67 to 365 individual per square meter were found. The percentage of larvae with false eyes varied between 6 and 84, and parasitoidism, within the range 2 to 47 (Table 19).

Table 19. Important quantitative data concerning the appearance of the web-spinning spruce sawfly on control areas for the autumn of 1980

State Forests District Admin. [OZLP]	Forest inspection jurisdiction	Max. no. larvae per 1 m^2	% of larvae with false eyes	% of larvae with parasitoidism
Katowice	Ustroń	365	6-30	ok. 2 %
	Wisła	750	21-84	
Kraków	Krościenko	67	39	14-47 %
	Piwniczna	162	48	8-27
	Gorczański PN*	678	31	7-51

*National Park

In comparison with the previous year, there was a significant decrease in the number of larvae found per square meter of drip-zone area, and the area of threatened tree stands decreased as well.

In 1981, insect control measures against this pest with the use of insecticides are foreseen, and in addition, it will be necessary to conduct observations on the development of the pest, as well as studies of the intensity of its feeding. In weakened tree stands, great attention should be paid to the appearance of secondary pests and the formation of deadwood, which should be removed from the forest in a timely fashion.

24. Cephalcia arvensis Panz.

For several years Cephalcia arvensis has been appearing in spruce tree stands, in varying intensities, on the territories of the Katowice and the Wroclaw OZLP's.

Controlled surveys for these larvae indicate a weak threat on an overall area of 48 ha (Table 20).

The maximum number of larvae per square meter was 63 individuals, while the

percentage of larvae with false eyes varied between 37 and 78%.

Table 20. Tabulation of area of spruce tree stands threatened by the feeding of Cephalcia abietis* in 1980

State Forests District Adminis. [OZLP]	Forest inspection jurisdiction	Deg. threat to tree stands			
		weak /+/	medium /++/	strong /+++/	overall
		Area in ha			
Katowice	Bielsko	32	-	-	32
	Węgierska Górka	14	-	-	14
	Wisła	2	-	-	2
Total		48	-	-	48

In comparison with the previous year, the decrease in the number of larvae found per square meter was significant, and the area of tree stands threatened by them was also reduced.

The occurrence of these pests in a cautionary degree was confirmed on the territory of the Katowice OZLP in the following forest inspection jurisdictions: Bielsko, 96 ha; Węgierska Górka, 132 ha; Ustroń, 157 ha; and Wisla, 268 ha; and on the Wroclaw OZLP, the following jurisdictions: Dystrzyca Klodzka, 50 ha; Kamienna Góra, 70 ha; Międzylefie, 70 ha; Szklarska Poręba, 142 ha; Świeradów, 107 ha; and Walbrzych, 95 ha. The overall area was 1,187 ha.

No insect control measures were carried out.

25. The fir sawfly (Lygaeonematus abiatum Christ.)

This pest insect attacks spruce trees 10-30 years old, in which it persists tenaciously for a series of years. As a result of chronic feeding on the part of the larvae, the young shoots dry out, and the crowns are subject to deformation.

*Tr. Note: The author may be confused, since he refers to this as a table for Cephalcia arvensis Panz.

It has especially negative effects on young spruce tree plantations.

In 1980 increased occurrences of the fir sawfly were observed throughout the whole country, but its strongest breeding center persists on the territory of the Olsztyn OZLP, where this pest has been registered since 1972. The feeding of the fir sawfly is observed in 77 forest inspection jurisdictions, based on the territories of 12 OZLP's. Its most numerous occurrences, and its relatively greatest areas, and are in the Bialystok, Olsztyn, and Wroclaw OZLP's (Tables 21 and 22).

Table 21. Tabulation of area of spruce tree stands damaged by the fir sawfly on the territories of the individual forest inspection jurisdictions in 1980

State Forests District Administrations [OZLP] For. insp. jurisd.	Deg. damage to tree stands			
	weak to 30 %	medium 31-60%	strong 60 %	over-all
1	2	3	4	5
Białystok				
Białowieża	28	-	-	28
Bielsk Podl.	1	-	-	1
Borki	515	68	-	583
Browsk	7	-	-	7
Czerwony Dwór	146	7	3	156
Ełk	131	1	-	132
Giżycko	22	5	-	27
Gołdap	64	2	-	66
Hajnówka	44	215	2	261
Maskulińskie	31	-	-	31
Olecko	154	18	1	173
Pisz	1	1	-	2
Rajgród	6	-	-	6
Suwałki	441	19	-	460
Trzciannne	1	-	-	1
Wolity	16	-	-	16
All together	1607	336	6	1949
Katowice				
Prudnik	10	-	-	10

1	2	3	4	5
Kraków				
Niepołomice	6	-	-	6
Suchedniów	3	-	5	8
All together	9	-	5	14
Lublin				
Garwolin	2	-	-	2
Kraśnik	2	-	-	2
Puławy	pjd	-	-	pjd
Rudnik	pjd	-	-	pjd
All together	4	-	-	4
Łódź				
Brzeziny	1	-	-	1
Olsztyn				
Bartoszyce	107	8	1	116
Dobre Miasto	28	19	4	51
Dwukoły	1	-	-	1
Elbląg	39	17	4	60
Górowo Iław.	159	112	47	318
Kwidzyń	6	-	-	6
Kudypy	17	-	-	17
Lidzbark	212	4	2	218
Mikołajki	130	-	-	130
Młynary	118	33	11	162
Mrągowo	22	12	11	45
Olsztyn				
Nidzica	264	12	-	276
Nowe Ramuki	5	20	41	66
Olsztynek	169	12	3	184
Srokowo	162	1	-	163
Stare Jabłonki	4	-	-	4
Susz	144	45	6	195
Strzałowo	200	114	-	314
Szczytno	97	17	6	110
Wichrowo	48	288	186	490
Wipsowo	40	-	-	40
Zaporowo	367	94	61	522
All together	2329	779	383	3489

1	2	3	4	5
Poznań				
Konstantynowo	15	-	3	18
Krotoszyn	2	-	-	2
All together	17	-	3	20
Szczecin				
Barlinek	35	-	-	35
Dobrzany	44	-	-	44
Gryfice	122	15	8	145
Lobez	88	-	-	88
Międzyrzecz	2	-	-	2
Myślibórz	10	2	4	16
Resko	40	12	2	54
Rokita	40	17	-	57
Szczecin				
Szczecin	4	-	-	4
Szczecinek	60	-	-	60
Trzebiel	6	-	-	6
All together	451	46	14	511
Szczecinek				
Gościno	200	3	-	203
Połczyn	109	-	-	109
Sławno	9	-	-	9
Świdwin	1	1	-	2
All together	409	4	-	413
Toruń				
Bydgoszcz	23	-	-	23
Chojnowo	23	3	3	29
Jamy	46	27	-	73
Kolbudy	7	-	1	8
Lipusz	12	-	-	12
Rumowo	1	-	-	1
Skrwilno	-	3	-	3
Starogard	18	4	-	22
All together	130	37	4	171

1	2	3	4	5
Wrocław				
Jawor	100	31	-	131
Lwówek Śl.	785	135	3	923
Świdnica	300	40	-	340
Świeradów	200	100	2	302
Złotoryja	200	93	-	293
All together	1585	399	5	1989
Zielona Góra				
Bieliców	1	3	1	5

Table 22. Overall tabulation of area of occurrence of fir sawfly on the territories of individual OZLP's in 1980

State Forests District Administration [OZLP]	No. of forest inspect. jurisd.	Deg. damage to tree stands: weak to 30 %	medium 31-60 %	strong & higher	Overall
Białystok	16	1607	336	6	1949
Katowice	1	10	-	-	10
Kraków	2	14	-	-	14
Lublin	4	4	-	-	4
Łódź	1	1	-	-	1
Olsztyn	22	2329	776	383	3488
Poznań	2	17	-	3	20
Szczecin	11	451	46	14	511
Szczecinek	4	409	4	-	413
Toruń	8	130	37	4	171
Wrocław	5	1585	399	5	1989
Zielona Góra	1	1	3	1	5
Total	77	6558	1601	416	8575

Experimental chemical recovery measures were carried out on 23 June 1980 in the Nowe Ramuka forest inspection jurisdiction (Olsztyn OZLP). Spraying with the insecticide "Tritox" was carried out using a knapsack spraying apparatus, the Arimitsu, over an area of about 1.5 ha. Initial evaluations of the effectiveness of the operation are positive. In 1981 a further continuation of test insect control measures against the above-named pest are projected.

26. The spruce gall adelgid (Adelges abietis Klth.) and the woolly aphid (Adelges viridis Ratz.)

These aphids cause tree deformation through the formation of gnarls on the spruce branches.

In 1980 the occurrence of these pests was indicated in seven forest inspection jurisdictions based on the territories of five OZLP's (Table 23).

Insect control measures were not carried out.

Table 23. Tabulation of area of occurrence of the spruce gall adelgid and the woolly aphid in 1980

State Forests District Administration [OZLP]	Overall area of occurrence in ha	Name of forest inspection jurisdiction
Katowice	21	Kabiór, Wisła /pjd/
Kraków		Sucha, Olkusz
Krosno	1	Narol, /uprawa/
Łódź		Dobieszyn /plantacja św./
Piła		Podanin

27. Pine bark adelgid (Pineus strobi Htg.)

This insect attacks primarily May shoots, as well as the larger branches and short shoots of the white pine (Pinus strobus).

In 1980 the occurrence of this pine bark adelgid was indicated in the Giżyco forest inspection jurisdiction (Bialystok OZLP) and in the Myszyniec forest inspection jurisdiction (Olsztyn OZLP), across an overall area of about 100 ha.

No insect control measures were undertaken.

28. Woolly aphid (Dreyfusia nordmannianae Eckst.)

This insect most frequently attacks fir tree pole wood, causing serious weakening, and even killing the trees.

In 1980 the occurrence of this pest was indicated in the Myślenice forest inspection jurisdiction (Kraków OZLP), where it made its appearance on individual trees across an overall area of 250 ha.

No insect control measures were carried out.

29. Fir celephorid (Celeophora laricella Hbn.)

This moth makes its appearance on young and old fir trees, both in naturally occurring tree stands, as well as in afforested areas with pathway and roadside stand densities.

In 1980, the occurrence of this fir tree celephorid was indicated in seven forest inspection jurisdictions based on the territories of three OZLP's. This insect caused complete defoliation of the trees in several places, especially in those trees growing on the borders of the tree stands.

Table 24. Tabulation of area of occurrence of the fir tree celephorid in 1980

State Forests District Administration [OZLP]	Overall area of occurrence in ha	Name of forest inspection jurisdiction, area of occurrence
Lublin	2	Sarnaki 2, Świdnik /enkówka/
Łódź	9	Poddębice 9
Szczecin		Drawno, Bierzwnik
Szczecinek	14	Drawsko 2, Świdwin 12
Total		7 forest inspect. jurisd.

30. Fir tree tortricid moths

For many years fir tree stands, in the region of the Holy Cross Mountains (Świętokrzyskie Góry), have been attacked by insects from the tortricid family, among which the most threatening is the bud worm (Choristoneura murinana Hb.).

The Forest Protection Association in Radom has carried out observations, and these indicate that this insect is marked by high viability.

In 1980, chemical insect control measures were carried out against the tortricid moths in the most threatened tree stands in the Kielce, Lagów, and the Suchedniów forest inspection jurisdictions on an overall area of 1,987 ha.

These operations were also carried out on the territory of the Holy Cross National Park on an area of 800 ha. Total area of tree stands encompassed by these recovery operations was 2,787 ha. The imported insecticides Decis and Ambusz were used in the insect control measures against the tortricid moths. In the Holy Cross National Park the biopreparation with the name Dipel was also used (Table 25).

Table 25. Tabulation of area of tree stands damaged by the feeding of tortricid moth caterpillars in 1980

State Forests District Admin: [OZLP]	Forest inspection jurisdiction	Deg. of damaged tree stands			
		to 30 %	31-60 %	greater than 60 %	Overall
		Area in ha			
Kraków	Kielce	418	569	258	1239
	Lagów	806	301	127	1233
	Suchedniów	833	472	35	1340
Total		2063	1342	417	3812

The recovery operations were begun on 11 June, and were ended on 14 June 1980.

Fine-drop spraying of the threatened forest complexes was carried out using a type Mi-2 helicopter. The effectiveness of this operation was great, amounting to about 90%. The biopreparation Dipel proved also to have satisfactory effectiveness.

As emerged from initial controls carried out in June 1980, despite the successful recovery operation against the tortricid moths, they will remain a serious problem in the region of the Holy Cross Mountains.

In 1981 it is expected that there will be an increased occurrence of bud worms in spruce tree stands in the forest inspection jurisdictions of Kielce, Lagów, and Suchedniów across a total area of 3,812 ha (Table 25). The remaining area of tree stands threatened and included among those subject to recovery operations will be determined on the basis of the results of caterpillar hatchings determined from photoecological operations, as well as by means of supplementary spring territorial observations.

It is expected that insect control measures will be carried out against this pest using the insecticides cited in Table 62.

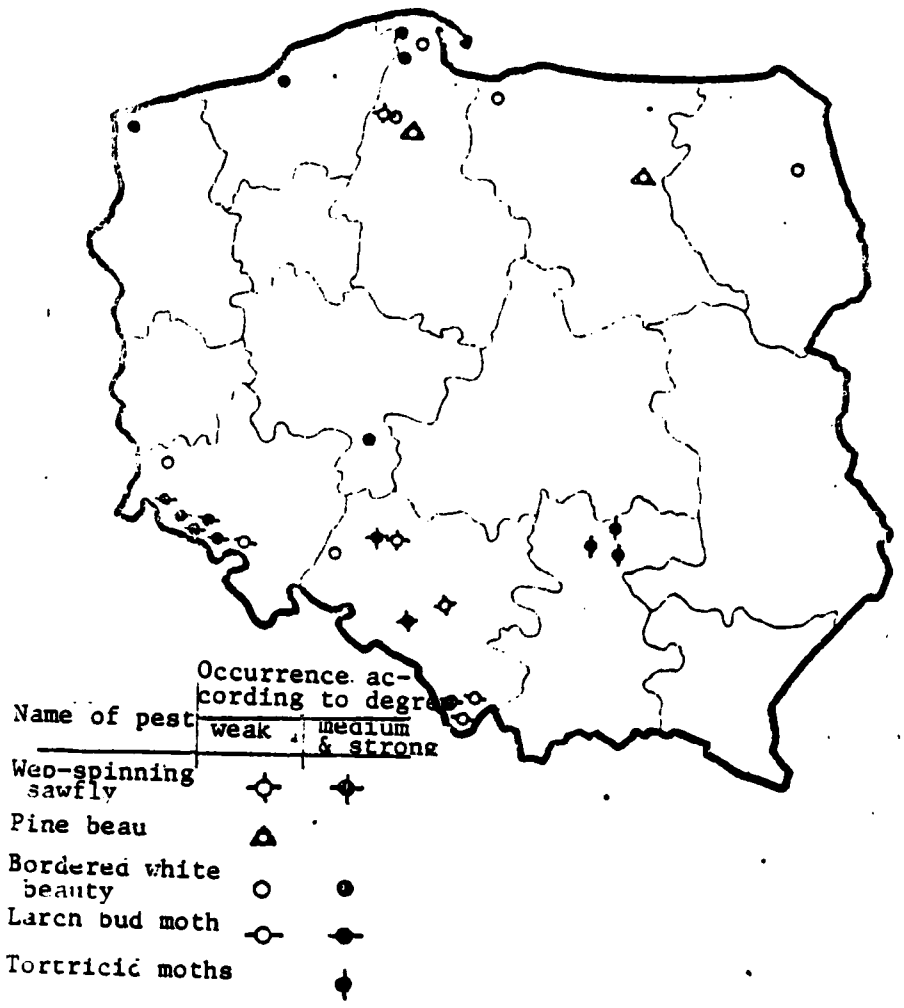

Fig. 3. Forecast occurrence of forest insect pests in 1981.

PART III

SECONDARY PESTS

For many years the secondary pests of conifer trees in Poland have been becoming a serious economic problem. In the period from 1 October 1979 to 30 September 1980, 2,347.5 thousand m^3 of lumber infested by insects was harvested in the State Forests (not including national parks) (Table 27). This amounts to

Table 26. Mass of conifer wood infested by secondary pests in the years 1975/1976-1975/1980

Period	Mass of lumber in thous. m^3	
	harvested	left
1975/76	1.770,4	974,6
1976/77	1.744,3	1.111,1
1977/78	1.789,6	1.229,7
1978/79	1.995,9	2.068,3
1979/80	2.347,5	2.460,8

351.6 thousand m^3 (about 18%) more than in the previous reporting year. As may be seen from Table 26, for the remaining years there is a situation of constantly increasing threat, which is expressed by the constant increase in the mass of infested lumber that was harvested in successive years, as well as by an increase in the mass of lumber qualifying for removal that was remaining in the forest after 1 October.

It seems highly probable that there exist substantial differences within the mass of lumber infested by secondary pests that was indicated in the reports and which was harvested in reality.

On 30 September 1979, there remained 2,460.8 thousand m^3 of lumber in the State Forests qualifying for removal, thus, more than all of the infested wood removed over the course of the entire fiscal year (the same situation is evident

Table 27. The course of insect control measures carried out against secondary pests in conifer tree stands in the period 1 October 1979 to 30 September 1980

Item No.	State Forests District Admin. [OZLP]	Lumber left in forest by 30 Sep'79 th. m^3	Mass of lumber harvested fm trees infested by second. pests during period: I-III th m^3	IV-VI th. m^3	VII-IX th. m^3	Total th. m^3	including standing trees th. m^3	th. m^3	Area harv. lumber th. ha	Lumber remaining f/removal (inc. breakage & uprooting) infested th. m^3	abandoned th. m^3	not infested ch. m^3	Total 9/30/80 th. m^3
1.	Białystok	66,5	96,3	55,0	43,9	195,1	121,5	46,4	88,4	7,0	26,2	48,0	81,2
2.	Katowice	408,8	241,0	139,2	125,4	505,6	161,4	63,8	30,3	36,8	188,6	191,1	419,8
3.	Kraków	86,9	67,1	30,2	26,5	123,8	54,0	18,4	25,7	8,5	26,9	43,2	78,9
4.	Kresno	100,1	58,8	31,3	25,7	115,8	40,7	18,8	25,5	12,3	85,0	362,1	459,4
5.	Lublin	36,4	18,2	62,9	9,8	89,7	45,2	16,7	23,7	3,2	19,8	95,2	118,0
6.	Łódź	67,8	58,4	27,3	18,5	110,1	54,6	23,2	40,8	12,8	29,2	42,8	84,9
7.	Olsztyn	70,1	68,3	48,4	43,3	160,0	74,8	27,1	61,3	10,7	22,0	51,3	84,0
8.	Piła	187,3	102,0	37,2	41,1	180,3	90,6	13,8	11,8	40,7	97,8	51,7	189,9
9	Poznań	80,0	32,2	34,0	11,1	87,3	38,5	7,8	13,1	11,8	28,3	23,4	63,5
10.	Szczecin	397,0	142,8	77,7	78,2	298,7	38,3	7,8	4,8	110,3	123,8	104,7	338,8
11.	Szczecinek	86,0	28,8	17,5	18,0	64,1	87,1	7,5	2,5	8,7	18,3	11,8	34,9
12.	Toruń	188,8	137,7	96,8	70,3	304,8	392,8	80,2	68,8	37,4	87,1	121,8	226,4
13.	Wrocław	155,8	7,2	38,2	38,7	83,0	42,1	18,0	7,7	14,1	80,7	135,0	209,8
14	Zielona G.	78,8	20,2	21,1	10,6	51,9	69,0	24,8	8,3	14,6	38,8	18,8	71,8
	Total	1936,2	1083,5	707,8	564,1	2347,8	1200,7	413,3	410,8	325,8	829,8	1302,4	2460,8

[th. = thousands]

also in the previous reporting period). In relation to the previous year, this constitutes an increase of 392.5 thousand m^3, or an increase of 19%.

Of the overall mass of lumber left in the forest and determined as qualifying for removal, wood infested by insects is 13%, barren deadwood 34%, and uninfested lumber, 53%.

In comparison with the previous year, the amount of harvested wood that was infested on the trunk changed somewhat, that is, from 1,259.0 thousand pieces (331.2 thousand m^3) to 1,200.7 thousand pieces (413.3 thousand m^3). This indicates a removal of a smaller number of trees from the forest than in the previous year, but a greater mass of lumber.

Among the many factors accounting for the unsatisfactory health conditions of our forests, tornadoes (high winds) deserve primary attention.

In the reporting period, 864.0 thousand m^3 of broken and uprooted trees infested by secondary insect pests were harvested, and 1,141.6 thousand m^3 still remained in the forest up to 1 October 1980 (Table 28).

The greatest mass of broken and uprooted trees is on the territories of the Krosno, Katowice, and Wroclaw OZLP's. As always, the greatest difficulty in removing the broken and uprooted trees was met within tree stands of the I and II age classes.

In addition to wind damage (and in places, damage caused by accumulated snow formations on the tree branches), industrial missions and disturbances in the water ratios caused by mining damage also have a great influence on the health and cleanliness conditions of the forests. Among the biotic factors, damages brought about by the nun moth (Lymantria monacha), which caused strong thinning-out of the crowns in many forest inspection jurisdictions in the northern part of the country, moved into leading position in 1980. In places where

Table 28. Tabulation of broken and uprooted conifer trees from the period 30 September 1979 to 1 October 1980 (according to the State Forests District Administration) (OZLP)

Item No.	State Forests District Administ. [OZLP]	Lumber remaining in forest on 30 Sep '79		Harvested lumber fm 1 Oct '79 - 30 Sep '80		Lumber remaining for removal on 30 Sep '80	
		Mass thousands m^3	Percent of overall mass of lumber remaining for removal	Mass thousands m^3	Percent of overall mass of lumber infested	Mass thousands m^3	Percent of overall mass of lumber remaining for removal
1.	Białystok	41,8	62,5	106,4	53,6	48,0	56,6
2.	Katowice	252,1	47,1	303,4	43,2	242,4	43,0
3.	Kraków	43,9	42,6	54,8	35,9	35,4	41,6
4.	Krosno	30,2	29,8	71,2	62,3	384,9	66,0
5.	Lublin	0,1	0,3	4,9	3,1	74,1	44,6
6.	Łódź	27,4	24,8	27,3	14,6	36,6	32,6
7.	Olsztyn	3,6	5,9	8,7	6,6	3,1	3,9
8.	Piła	144,7	53,6	131,4	48,2	93,0	34,4
9.	Poznań	1,9	2,7	6,0	0,0	2,7	5,1
10.	Szczecin	15,2	24,5	5,4	9,8	21,2	31,5
11.	Szczecinek	135,9	53,9	95,4	56,6	81,0	42,8
12.	Toruń	7,5	7,1	13,1	8,9	3,9	1,0
13.	Wrocław	84,3	39,7	35,1	31,7	113,6	42,2
14.	Zielona Góra	2,8	4,5	0,9	4,2	1,5	4,8
	Total	791,2	28,5	864,0	27,1	1141,6	32,2

the feeding was repeated, this resulted in an increased occurrence of deadwood, and this was contributed to also by secondary pests. Undergrowth spruce trees and spruce trees from the II layer in mixed naturally-occurring tree stands and in pine-spruce tree stands also suffered losses to considerable degrees.

In the Karkonosz and Izerski Mountains, this resulted in a tremendous density of secondary pest populations in spruce tree stands subjected to the feeding of the larch-bud moth (Zeiraphera griseana) for several years.

In addition, there was further serious weakening of conifer tree stands in connection with the generalized occurrence of parisitic fungi, especially honey fungus and root fungus. Pine tree stands based on former arable lands, as well as mountain spruce and the spruce in the Mazovian region, suffer mostly from these.

In the Holy Cross Mountains, different biotic and abiotic factors, together giving rise to a chain of fir diseases, were the cause for the increased formation of deadwood. One of the important links in these diseases is also the tortricid moth.

Signals were received from various regions in the country concerning damages caused by deer. The greatest significance in this respect is doubtless the tapping of pine and spruce by deer (Cervus elaphus), and in places, by elk, and in the mountains, among other places, roe-deer (Capreolus capreolus) cause certain damage by eating shoots of fir trees, among other things.

Methods of cultivation management and the promptness of carrying out certain operations and other functions have a great influence on the intensities of the occurrences of xylophages and cambiophages. Of particular significance here is the delayed removal of harvested wood, which has not been stripped of its bark and protected by chemical insecticide means. For several years now, the mass of lumber lying at its felling site for periods of many months has been determined

at several million m^3. The overwhelming majority of this lumber is infested by secondary insect pests, and then consequently, it is subject to depreciation. Many forest inspection jurisdictions complain about the difficulties connected with the use of insecticides for safeguarding raw lumber against cambiophages and xylophages. There are also difficulties connected with the equipment. Most of the spraying done to lumber is done too late, and in connection with this, the effectiveness of the operation is only slight.

Many forest inspection jurisdictions are also, in addition, in error in the area of carrying out cultivation clearing and cutting back, and in addition, cultivation operations in diseased wood stands, that is, those subject to industrial emissions and weakened by the feeding of the nun moth, among others, are carried out only once or too early, leading to excessive thinning out of the wood stands and the occurrence of gaps in them, but the intensity of the pests there is not reduced.

The growing deficit in the labor force is leading to a considerable degree of neglect in the area of forest hygiene, neglect of the timely removal of trees with trunk infestations, the neglect of removing the bark from felled trees and sorted lumber, as well as the neglect of many other factors exerting an influence on the sanitary state of the forest and on the increase in the density of the populations of various kinds of secondary pests.

In 1981 efforts will have to be made to see that all unbarked lumber harvested in the autumn-winter period is hauled out of the forest. For pine the region of threat that has been determined is at least 3 km. Attention will also have to be paid, at the same time, to ensure that the insect control measures carried out against secondary pests is a continuous and ongoing process, and that it not be organized in the form of activities whose results are not at all the liquidation of the pest insects, but only for the purpose of carrying out cosmetic measures. Their essence lies usually only in the removal of barren deadwood, as well as the removal of "standing deadwood."

Where it is possible, it should be recommended that two variations of mechanical deep decortication be used for the sorted lumber. The bark, in which young cockchafer bark-boring beetles are found should neither be stored near a forest, nor hauled into tree stands where there will be a threat of the occurrence of new gradation centers for secondary pests.

In regions where there are many water collectors, it is possible to take advantage of the decreased threat to conifer wood stands by secondary pests by submerging the lumber that has not been stripped of its bark. Cases of storing wood on rollways where it has been hauled to but has not been thrown into the water should not be tolerated. There exists also the feasibility of protecting great masses of conifer wood lumber against secondary pests by sprinkling it with water during the vegetation period. As a result of excessive moisture in the wood and the lowering of the temperature, the majority of insect pests infesting sprinkled wood should die out, and with the rest of them, the development of their individual stages should be drawn out to such an extent that the protected wood can be processed before the appearance of the young generation cockchafers.

It is also necessary to take pains to see that chemical measures are undertaken on stored wood during the initial period of swarming, and not during the so-called "emerging cockchafer period," when its effectiveness is significantly less.

Incompetence in the description of the types of pest insects feeding under the bark and in the wood has been confirmed in several situations. As is well known, the correct description of pest insects assures the possibilities of choosing the most effective methods for controlling them, and the most effective methods for carrying out measures in a timely fashion, and in the same way, for assuring the least amount of damage and the greatest thinning out of cambiophage and xylophage populations.

31. Secondary pine pest insects

In the period 1 October 1979 to 30 September 1980, the mass of harvested pine lumber suppressed by secondary pest insects amounted to 1,773.6 thousand m^3 (Table 29), that is, 299.4 thousand m^3 (20%) more than in the previous reporting period. The greatest amounts were harvested on the territories of the Katowice, Toruń, and Szczecin OZLP's; a great amount was harvested in the Pila and Bialystok OZLP's, and the least amount in the Wroclaw, Krosno, and Zielona Góra OZLP's.

Lumber infested on the trunk amounted to not quite 18% of the overall mass of harvested lumber suppressed by cambiophages and xylophages, that is, about 1% more than in the previous reporting period.

From May to June 1980, that is, during the period of the most effective insect control measures undertaken against secondary pests, and especially against the greater gall wasps, 35% was harvested (Table 30), that is, 2% less than in the previous year. In addition, in comparison with the total mass of lumber infested that was harvested, as well as in comparison with the lumber left in the forest for clearing away, this amounts to only 17%, that is, 1% less than in the previous reporting period.

The mass of lumber left in the forest on 30 September 1980 qualifying for removal was estimated by the forest inspection jurisdictions to be 1,754.2 thousand m^3, that is, 178.4 thousand m^3 (11%) more than in the previous year. A fact requiring attention is that the situation is getting worse from year to year. For the period of the winter 1980/1981, there was, in fact, as much lumber in the forest qualifying for removal as was removed over the entire reporting period. It may be seen from Table 29 that, what is more, although 50% of the indicated mass of lumber is not infested, still 36% of the lumber is described as barren deadwood and 14% of it is taken as infested by cambiophages and xylophages.

The cited information testifies to the very great danger existing especially

Table 29. The course of insect control measures undertaken against secondary pests in pine tree stands for the period 1 October 1979 to 30 September 1980

Item No.	State Forests District Administ. [OZLP]	Lumber left in forest 9/30/80 th. m^3	Mass of lumber harvested from trees infested by second. pests during periods: I-III th. m^3	IV-VI th. m^3	VII-IX th. m^3	Total in th. m^3	Includ. standing trees thous. pieces	th. m^3	Surface area of harvested lumber th. m^3	Lumber left f/removal (incl. brkn & uprooted) infested th. m^3	abandoned th. m^3	not infested th. m^3	Overall 9/30/80 th. m^3
1.	Białystok	48,6	73,3	36,9	24,2	134,4	92,3	28,9	32,5	8,6	10,9	36,1	81,6
2.	Katowice	278,2	188,5	88,8	73,4	320,8	103,9	34,8	18,3	13,3	124,5	122,6	284,4
3	Kraków	48,6	32,4	17,2	10,9	60,5	34,4	8,8	17,1	2,8	21,2	18,0	41,6
4	Kreszo	21,0	24,8	13,1	9,6	47,4	23,9	10,5	13,6	1,4	30,3	219,0	223,7
5	Lublin	32,4	16,1	61,8	8,6	86,5	40,8	14,9	32,3	1,9	17,2	83,1	112,3
6	Łódź	68,7	68,3	26,2	18,7	104,1	90,8	23,2	38,4	13,2	26,5	42,1	82,6
7	Olsztyn	81,6	60,7	33,7	26,5	120,9	30,7	14,2	37,0	8,9	16,8	40,8	83,3
8	Piła	164,1	100,3	36,4	38,7	176,4	68,9	13,1	11,2	30,9	96,4	80,8	184,3
9	Poznań	81,0	28,6	21,6	10,1	60,3	23,7	6,7	18,0	10,6	28,9	22,3	80,6
10	Szczecin	361,9	132,8	67,9	67,6	268,3	32,7	6,0	4,3	103,4	110,0	91,7	305,1
11	Szczecinek	41,2	28,9	14,5	15,0	58,4	54,6	7,0	1,5	6,6	6,6	4,1	18,3
12	Toruń	174,0	127,7	87,2	63,7	278,6	282,7	45,-	82,2	32,6	81,3	104,5	300,6
13	Wrocław	28,5	2,4	14,8	2,3	19,3	13,7	3,1	4,3	0,8	20,7	8,1	29,6
14	Zielona Góra	78,1	29,0	21,9	10,6	61,5	64,5	24,7	9,3	14,3	38,1	18,8	71,0
	Total	1440,8	884,7	541,3	377,6	1773,6	907,0	310,4	304,2	248,7	628,4	873,0	2754,2

[th. = thousands]

in these pine stands, which have been subjected to weakening as a result of the strong thinning out of the crowns by the nun moth caterpillars, and also, where great amounts of breakage and tree uprootings have accumulated.

As may be seen from Table 31, the greatest amounts of pine lumber suppressed by secondary pests were harvested in the following forest inspection jurisdictions: Dojlidy and Żednia (Bialystok OZLP); Koszęcin, Lubliniec, Kobiór, Rudziniec, Rudy Rac., Kolonowskie, Klobuck, Kędzierzyn, Herby, and Tulowice (Katowice OZLP); Niepolomice (Kraków OZLP); Oleszyce (Krosno OZLP); Janów Lub (Janów OZLP); Piotrków (Lódź OZLP); Czlope, Miroslawieo. Podanin, Sarbia, Trzcianka, and Waloz (Pila OZLP); Drawno, Bierzwnik, Glusko, Dobrzany (Szczecin OZLP); Zlocieniec, Drawsko (Szczecinek OZLP); Osie, Różanna, Lubichowo, Czerpiszewo, Dębrowa, Gniewkowo, Zamrzenica, Wloclawek (Toruń OZLP). In all the forest inspection jurisdictions mentioned above, the mass of infested harvested lumber exceeded 10,000 m^3, but in several cases, it exceeded even 70,000 m^3 (Drawno), and 50,000 m^3 (Zlocieniec).

The most important reasons for increased and large-scale occurrences of deadwood are represented in Table 33. Among the abiotic factors, tornadoes (high winds) deserve particular attention; they caused increased occurrences of secondary damage in 235 forest inspection jurisdictions. Among the abiotic factors, branch damage caused by snow is in second place; it caused a great amount of breakage and uprooting in 155 forest inspection jurisdictions. Industrial air pollution also deserves attention, especially in the Katowice, Kraków, Toruń, and Lódź OZLP's, as well as damage from mining operations, especially in the Katowice and Lódź OZLP's. Disturbances in the water relationships in the forests, and especially excessive soil moisture, favored, among other things, the occurrence of numerous uprootings, and in this way, the occurrence of gradation centers for secondary pests indicated in 34 forest inspection jurisdictions in various parts of the country.

Among the biotic factors, parasitic fungi deserve particular attention, and

Table 30. The more important indicators on the insect control measures undertaken against secondary pine pests in the fiscal year 1979/80

Item No.	State Forests District Administration [OZLP]	% portion of lumber infested & harvested between April & June in relation to:	
		Overall mass of lumber harvested in 1979/80	Overall mass of lumber harvested and left in year 1979/80
1.	Białystok	27	19
2.	Katowice	28	15
3.	Kraków	28	17
4.	Krosno	28	4
5.	Lublin	72	31
6.	Łódź	25	14
7.	Olsztyn	30	19
8.	Piła	21	10
9.	Poznań	36	18
10.	Szczecin	25	12
11.	Szczecinek	26	20
12.	Toruń	31	18
13.	Wrocław	77	30
14.	Zielona Góra	41	17
Total		36	17

especially root fungus and honey fungus, and in places also, rust, which results from a weakening of the trees and a reduction in their resistance to attack from cambiophages and xylophages. In many naturally-occurring tree stands subjected to parasitic fungi, the secondary pests occur in chronic form.

The feeding of the nun moth led to very marked weakening of tree stands in the northern region of the country. In places where complete denudative feeding took place two times, as well as in places of the occurrence of secondary pests, the necessity arose for carrying out preventive clearing and cutting operations, and in places, even to the establishment of full felling sites.

In the reporting period discussed above, breakages and uprootings occurred throughout the territory of the entire country (Table 34). Much damage arose especially in August 1980.

Table 31. Tabulation of forest inspection jurisdictions reporting occurrences of secondary pine pests

Item No.	State Forests District Adminis. [OZLP]	Mass of infested wood harvested, thous. m^3	Forest inspection-jurisdictions
1	2	3	4
1.	Białystok	0	-
		<1	Trzcianne, Łomża, Nowogród, Czerwony Dwór, Głęboki Bród, Gołdap, Olecko
		1 - 2	Borki, Ełk, Giżycko, Suwałki
		2 - 5	Białowieża, Browsk, Hajnówka, Narew, Rudka, Supraśl, Waliły, Rajgród, Drygały, Płaska, Pomorze, Szczebra.
		5 -10	Bielsk, Czarna Białostocka, Mańkulińskie, Pisz, Augustów
		10 - 15	-
		15 - 20	-
		>20	Dujlidy, Żednia
2.	Katowice	0	-
		<1	Andrychów, Bielsko, Koniecpol,
		1 - 2	Olkusz, Siewierz
		2 - 5	Złoty Potok, Krasiejów, Kup, Brzeg, Prószków, Prudnik, Namysłów, Turawa, Brynek, Czarnków, Katowice
	Katowice	5 - 10	Gidle, Olesno, Kluczbork, Strzelce Op., Rybnik, Świerklaniec,
		10 - 15	Herby, Tułowice
		15 - 20	Kłobuck, Kędzierzyn
		>20	Koszęcin, Lubliniec, Kobiór, Rudziniec, Rudy Raciborskie, Kolonowskie

1	2	3	4
3.	Kraków	0	Krościenko, Nowy Targ, Piwniczna, Stary Sącz
		<1	Gromnik, Limanowa, Myślenice
		1 - 2	Brzesko, Gorlice, Jędrzejów, Kielce, Pińczów, Ruda Maleniecka, Suchedniów
		2 - 5	Barycz, Dąbrowa Tarnowska, Dębica, Krzeszowice, Ostrowiec, Lagów, Miechów, Nowojowa, Starachowice, Włoszczowa,
		5 - 10	Łosie,
		10 - 15	Niepołomice
4.	Krosno	0	-
		<1	Brzegi Dolne, Kołaczyce, Lesko, Żmigród, Kańczuga, Strzyżów,
		1 - 2	Komańcza, Rymanów, Narol, Głogów, Kolbuszowa, Mielec, Tuszyma,
		2 - 5	Baligród, Brzozów, Dukla, Dynów, Łańcut, Krasiczyn,
		5 - 10	Sieniawa
		10 - 15	Oleszyce
5.	Lublin	0	-
		<1	Chełm, Lubartów, Mińsk Mazowiecki, Mircze, Rozwadów, Rudnik, Strzelce, Świdnik, Tomaszów, Zwierzyniec,
		1 - 2	Garwolin, Puławy, Siedlce
		2-5	Biała Podlaska, Biłgoraj, Buda Stoleńska, Krasnystaw, Stoczek, Łuków, Międzyrzec, Parczew, Radzyń, Sarnaki, Sobibór, Sokołów, Włodawa
		5-10	Józefów, Kraśnik, Łochów,
		10-15	Janów,
6.	Łódź	0	-
		<1	Radom, Sieradz,
		1-2	Dobieszyn, Łąck, Przysucha, Żwoleń,
		2-5	Bełchatów, Gostynin, Grójec, Kolumna, Kozienice, Płock, Wieluń, Złoczew, Skarżyska,

1	2	3	4
		5-10	Brzesiny, Grotniki, Opocsno, Poddębice, Nadomsko, Skierniewice, Spała
		10-15	-
		15-20	Piotrków
7	Olsztyn	<1	Bartoszyce, Dobrocin, Górowo Ił., Miłomłyn, Młynary, Srokowo, Zaporowo,
		1-2	Elbląg, Iława, Kudypy, Myszyniec, Susz, Wipsowo
	Olsztyn	2 - 5	Ciechanów, Działdowo, Kwidzyń, Lidzbark, Mrągowo, Nidzica, Nowe Ramuki, Ostrołęka, Ostrów Maz., Płońsk, Pułtusk, Wichrowo, Wielbark, Wyszków
		5 -10	Jedwabno, Olsztynek, Prasnysz, Spychowo, Strzałowo, Szczytno, Stare Jabłonki
8.	Piła	0	-
		<1	-
		1 - 2	-
		2 - 5	Durowo, Krzyż, Okonek, Potrzebowice, Wronki,
		5 -10	Jastrowie, Wyrzysk, Zdrojowa Góra, Złotów,
		10 -15	Trzcianka, Wałcz,
		15 -20	Serbia
		>20	Człopa, Mirosławiec, Podanin
9.	Poznań	<1	Góra Śląska,
		1 - 2	Grodzisc, Jarocin, Koło, Lopuchówko, Oborniki, Przedborów,
		2 - 5	Babki, Gniezno, Grodzisk, Kerzma Borowa, Konin, Konstantynowo, Kościan, Krotoszyn, Piaski, Pniewy, Syców, Tarnowów,
		5 -10	Antonin, Turek

1	2	3	4
10.	Szczecin	0	-
		<1	Bogdaniec, Gryfino, Karwin, Międzychód, Myślibórz, Ośno Lubuskie,
		1 - 2	Bolewice, Dębno, Gryfice, Międzyzdroje, Trzciel
		2 - 5	Barlinek, Chojna, Kliniska, Kłodawa, Międzyrzec, Nowogard, Resko, Rokita, Stepin, Szolarz,
		5 -10	Goleniów, Lobez, Mieszkowice, Skwierzyna, Trzebiez
		20 -30	Dobrzany,
		40 -50	Bierzwnik, Głusko,
		70 -80	Drawno
11.	Szczecinek	0	-
		<1	Lębork, Połczyn, Sławno,
		1 - 2	Świdwin, Ustka, Czarne, Człuchów, Gościno, Manowo, Szczecinek,
		2 - 5	Bobolice, Dretyń, Leśny Dwór, Niedźwiady, Osusznica, Wareino,
		5 -10	Białogard, Bytów, Czaplinek, Miastko,
		20 -30	Drawsko
		50 -60	Złocieniec.
12.	Toruń	0	-
		<1	Żołędowo,
		1 - 2	Kartuzy,
		2 - 5	Bydgoszcz, Chocinowo, Czerek, Gdańsk, Golub-Dobrzyń, Jasy, Kolbudy, Kościerzyna, Miroda, Przymuszewo, Skrwilno,
	Toruń	5 - 10	Brodnica, Dobrzejewice, Gołąbki, Kalisko, Lipusz, Runowo, Rytel, Starogard, Strzebielino, Szubin, Tuchola, Wejherowo,
		10 - 15	Cierpiszewo, Dąbrowa, Gniewkowo, Zamrzenica, Włocławek,
		15 - 20	Lubichowo,
		20 - 30	Osie, Różanna,

1	2	3	4
13.	Wrocław	0	-
		<1	Bardo Śląskie, Bierutów, Bolesławiec, Dąbno, Duszniki, Legnica, Lwówek, Miękinia, Milicz, Oborniki, Oława, Pieńsk, Świdnica, Świeradów, Węglińnice, Żmigród,
		1 - 2	Głogówko, Grochowo, Złotoryja,
		2 - 5	Chociszów, Lubiń, Ruszów,
14.	Zielona	0	-
	Góra	<1	-
		1 - 2	Sława, Wolsztyn, Zielona Góra,
		2 - 5	Bisłków, Bobrowice, Cabin, Krosno, Krzystkowice, Lubsko, Nowa Sól, Sulechów, Szprotawa, Świebodzin, Torzym,
		5 -10	Lipniki, Wymierki.

Table 32. Select tabulation of forest inspection jurisdictions according to the mass of pine lumber infested by secondary pine pests in the period 1 October 1979 to 30 September 1980

Item No.	State Forests District Adm. [OZLP]	Mass of harvested lumber (thousands of m^3)								
		0	<1	1-2	2-5	5-10	10-15	15-20	>20	Total
		Number of forest inspection jurisdictions								
1.	Białystok	-	7	4	12	5	-	-	2	30
2.	Katowice	-	3	2	11	6	2	2	6	32
3.	Kraków	4	3	7	10	1	1	-	-	26
4.	Krosno	-	6	7	6	1	1	-	-	21
5.	Lublin	-	10	3	13	3	1	-	-	30
6.	Łódź	-	2	4	9	7	-	1	-	23
7.	Olsztyn	-	7	6	14	7	-	-	-	34
8.	Piła	-	-	-	5	4	2	1	3	15
9.	Poznań	-	1	6	12	2	-	-	-	21
10.	Szczecin	-	6	5	10	5	-	-	4	30
11.	Szczecinek	-	3	7	6	4	-	-	2	22
12.	Toruń	-	1	1	11	12	5	1	2	33
13.	Wrocław	-	16	3	3	-	-	-	-	22
14.	Zielona Góra	-	-	3	11	2	-	-	-	16
	Total	4	65	58	133	59	12	5	19	355

Table 33. Reasons for increased occurrences of pine deadwood in 1980

Item No.	State Forests District Admin. [OZLP]	Factors									
		Atmospheric				Industrial		Biotic			Other
		high winds	frost	snow on branches	disturbances in water economy	smoke	mining damage	deer	insects *	fungus	
		Number of forest inspection jurisdictions									
1.	Białystok	21	2	15	-	-	-	-	-	10	1
2.	Katowice	24	2	19	4	15	7	-	-	13	5
3.	Kraków	18	2	15	-	5	-	-	-	11	1
4.	Krosno	12	1	13	-	-	-	-	-	4	-
5.	Lublin	24	1	6	-	9	1	-	-	28	-
6.	Łódź	17	2	16	2	4	3	-	-	18	3
7.	Olsztyn	21	2	18	1	-	-	-	-	27	-
8.	Piła	10	-	10	1	-	-	-	-	7	2
9	Poznań	19	-	-	16	3	-	-	-	19	5
10	Szczecin	14	2	14	7	1	-	-	-	16	-
11	Szczecinek	12	-	10	-	-	-	1	-	15	-
12	Toruń	20	3	9	6	4	-	1	-	26	-
13	Wrocław	18	2	7	-	3	1	2	-	8	3
14	Zielona Góra	5	-	3	7	3	-	8	-	9	7
	Total	235	19	155	44	47	12	12		209	27

*lack of useful data

Table 34. Tabulation of pine tree breakage and uprooting from the period 30 September 1979 to 1 October 1980 (according to the State Forests District Administrations [OZLP's])

Item No.	State Forests District Administ. [OZLP]	Lumber left in forest on 9/30/79		Lumber harvested in per. 10/1/79-9/30/80		Lumber remaining for removal on 9/30/80	
		Mass in thous. m^3	% overall lumber mass remaining for removal	Mass in thous. m^3	% overall lumber mass infested	Mass in thous. m^3	% overall lumber mass remaining for removal
1.	Białystok	31,5	64,0	75,3	58,0	36,2	59,0
2.	Katowice	196,7	71,0	213,7	67,0	188,3	64,0
3.	Kraków	23,2	30,0	27,5	45,0	18,0	43,0
4.	Krosno	7,9	38,0	26,1	55,0	241,8	93,0
5.	Lublin	0,1	1,0	4,2	5,6	73,3	65,3
6.	Łódź	27,1	41,2	26,3	25,7	36,1	43,6
7.	Olsztyn	2,0	3,8	3,9	3,4	2,2	3,5
8.	Piła	144,1	87,8	130,5	74,0	92,3	49,3
9.	Poznań	1,8	3,5	0,0	0,0	2,4	4,1
10.	Szczecin	8,8	24,5	2,7	9,8	10,6	31,5
11.	Szczecinek	130,1	68,6	91,5	68,3	74,5	46,4
12.	Toruń	5,9	3,4	9,3	3,3	3,9	1,9
13.	Wrocław	4,9	17,1	2,3	11,9	7,5	25,3
14.	Zielona Góra	1,2	1,5	0,8	1,6	1,4	2,9
	Total	585,1	34,0	615,2	30,5	768,5	36,0

In the forests of several tens of forest inspection jurisdictions in the Pila, Szczecin, and Szczecinek OZLP's, further, a significant amount of breakage took place as a result of snow damage to the branches in the period 1978/1979. Lumber found for the most part in tree stands of the I and II age classes is already becoming primarily barren deadwood, either due to infestation or because of technical damage.

A list of forest inspection jurisdictions for which determinations of the amount of breakage and uprooting were determined is shown in Table 35, and indicated as well are the forest inspection jurisdictions in which there remained lumber after the high woods for removal. More than 50,000 m^3 of breakage and uprooting took place in the Drawno forest inspection jurisdiction (Szczecin OZLP); from 20,000 to 50,000 m^3 was in the following forest inspection jurisdictions: Dojlidy (Bialystok OZLP), Rudy Racib. (Katowice OZLP), Komańoza, Lesko, Narol, Oleszyce, and Sicniawa (Krosno OZLP), Miroslawiec (Pila OZLP), Dobrzany and Glusko (Szczecin OZLP), as well as Drawsko (Szczecinek OZLP). From 15,000 to 20,000 m^3 of breakage and uprooting occurred in the forests of the following forest inspection jurisdictions: Lubliniec, Brynek, and Kobiór (Katowice OZLP), Sobibor (Lublin OZLP), and Zlocieniec (Szczecinek OZLP).

As may be seen from Table 35, more than 10% of the total number of 355 forest inspection jurisdictions had more than 10,000 m^3 of pine wood infested by secondary pests.

These interesting data have been presented numerically in tabular form, from which it emerges that at the end of September 1979, there had occurred 585.1 thousand m^3 of breakage and uprooting, which amounted to 34% of the total mass of lumber qualifying for removal, and at the end of September 1980, this mass had increased to 768.5 thousand m^3, in addition to which, over the period of the whole year, 615.2 thousand m^3 of breakage and uprooting occurred.

Table 35. Tabulation of pine trees infested by secondary pests subject to breakage and uprooting in the fiscal year 1979/80 (according to forest inspection jurisdiction)

Item No.	State Forests District Administration [OZLP]	Mass harvested lumber for per. Oct 79-Sep 80 thousands m³	Forest inspection jurisdiction	Mass lumber remain. f/removal on 9/30/80 thousands m³	Forest inspection jurisdiction
1	2	3	4	5	6
1.	Białystok	0	Waliły, Łomża, Borki, Drygały, Ełk, Maskulińskie, Olecko, Pisz,	0	Trzcianne, Łomża, Drygały, Ełk, Gołdap, Olecko, Pomorze, Suwałki, Szczebra, Maskulińskie,
		<1	Białowieża, Trzcianne, Nowogród, Rajgród, Czerwony Dwór, Giżycko, Głęboki Bród, Gołdap, Suwałki, Szczebra	<1	Białowieża, Browsk, Hajnówka, Narew, Nowogród, Borki, Czerwony Dwór, Giżycko, Głęboki Bród, Pisz, Płaska
		1-2	Browsk, Hajnówka, Płaska, Pomorze,		
		2-5	Czarna Białostocka, Narew, Rudka, Supraśl, Augustów	1-2	Bielsk, Czarna Białostocka, Rudka, Waliły,
		5-10	Bielsk	2-5	Supraśl, Żednia,
		>20	Dojlidy, Żednia	>20	Dojlidy
2	Katowice	0	Koniecpol,	0	Koniecpol,
		<1	Andrychów, Bielsko, Olesno, Olkusz, Siewierz	<1	Bielsko, Olesno, Złoty Potok, Kluczbork, Prószków, Namysłów,
2	Katowice	1-2	Złoty Potok, Kluczbork, Kup, Prószków, Namysłów, Chrzanów, Katowice,	1-2	Turawa, Katowice, Olkusz, Siewierz Andrychów, Gidle, Prudnik, Świerklaniec,
		2-5	Gidle, Kreciejów, Brzeg, Prudnik, Strzelce Op., Turawa, Brynek, Świerklaniec	2-5	Herby, Kłobuck, Kędzierzyn, Kup, Brzeg, Tułowice, Chrzanów,
		5-10	Herby, Kędzierzyn, Tułowice, Rybnik,	5-10	Koszęcin, Kreciejów, Rybnik,

1	2	3	4	5	6
		10–15 15–20 >20	Kłobuck, Rudziniec, Kobiór, Kamięcin, Lublinice, Kolonowskie, Rudy Rac.	10–15 15–20 >20	Kolonowskie, Strzelce Op., Rudziniec, Lublinice, Brynek, Kobiór, Rudy Rac.,
3	Kraków	0 <1 1–2	Gromnik, Jędrzejów, Krościenko, Barycz, Krzeszowice, Limanowa, Miechów, Myślenice, Nowy Targ, Piwniczna, Ruda Maleniecka, Stary Sącz, Suchedniów, Ostrowiec, Pińczów, Starachowice, Kielce, Brzesko, Dąbrowa Tarnowska, Dębica, Gorlice, Lagów, Włoszczowa,	0 <1 1–2	Barycz, Brzesko, Gromnik, Jędrzejów, Krościenko, Krzeszowice, Limanowa, Myślenice, Nowy Targ, Ostrowiec, Piwniczna, Ruda Maleniecka, Suchedniów, Kielce, Lagów, Miechów, Dębica, Nowojowa, Starachowice, Stary Sącz, Gorlice, Pińczów, Włoszczowa,
3.	Kraków	2–5 5–10	Nowojowa, Leżajsk, Niepołomice,	2–5 5–10	Leżajsk, Niepołomice, Dąbrowa Tarnowska,
4	Krosno	0 <1 1–2 2–5 10–15	Komańcza, Dynów, Krzeszyna, Brzegi Dolne, Kołaczyce, Lesko, Rymanów, Żmigród, Kańczuga, Narol, Kolbuszowa, Strzyżów, Tuszyma, Dukla, Leżajsk, Mielec, Baligród, Brzozów, Oleszyce	0 <1 1–2 5–10 >20	Brzozów, Kołaczyce, Kańczuga, Głogów, Rymanów, Żmigród, Kolbuszowa, Leżajsk, Strzyżów, Tuszyma, Baligród, Brzegi Dolne, Dukla, Dynów, Mielec, Krzeszyna, Komańcza, Lesko, Narol, Oleszyce, Sieniawa,

1	2	3	4	5	6
5	Lublin	0	Biała Podlaska, Biłgoraj, Bude Stalowska, Garwolin, Janów, Lubartów, Łochów, Luków, Międzyrzec Mińsk Mazowiecki, Mircze, Parczew, Puławy, Radzyń, Rozwadów, Rudnik, Sarnaki, Siedlce, Strzelce, Świdnik, Włodawa, Zwierzyniec,	0	Biłgoraj, Chełm, Janów; Kraśnik, Lubartów, Mińsk Mazowiecki, Mircze, Parczew, Puławy, Rozwadów, Sarnaki Siedlce, Strzelce, Świdnik, Zwierzyniec,
		<1	Chełm, Józefów, Krasny-staw , Kraśnik, Sobibór, Tomaszów,	<1	Buda Stalowska, Krasnystaw, Sokołów,
		1-2	Stasz6w,	1-2	Stasz6w, Łochów, Luków, Rudnik, Tomaszów,
5	Lublin	2-5	Sokołów,	2-5	Biała Podlaska, Garwolin, Józefów, Międzyrzec, Radzyń,
				5-10	Włodawa,
				15-20	Sobibór
6	Łódź	0	Bełchatów, Gostynin, Grójec, Kozienice, Łęck, Radom, Spała,	0	Bełchatów, Gostynin, Kozienice, Radom, Sieradz, Skarżysko, Zwoleń
		<1	Brzeziny, Dobieszyn, Kolumna, Płock, Poddębice, Przysucha, Sieradz, Skarżysko; Wieluń Złoczew, Zwoleń, WZL,	<1	Kolumna, Łęck, Płock, Przysucha, Radomsko, Wieluń, Złoczew, WZL,
				1-2	Brzeziny, Gretniki, Poddębice, Skierniewice, Spała,
		1-2	Gretniki, Radomsko,	2-5	Opoczno,
		2-5	Opoczno, Skierniewice,	5-10	Dobieszyn, Piotrków,
		10-15	Piotrków	10-15	Grójec,
7	Olsztyn	0	Bartoszyce, Ciechanów, Dobrocin, Elbląg, Iława, Jedwabno, Kwidzyń, Lidzbark, Miłomłyn, Myszyniec, Nidzica, Nowe Ramuki, Płońsk, Przasnysz, Pułtusk, Srokowo, Strzałowo, Susz, Szczytno, Wichrowo, Wielbark, Wyszków, Zaporowo	0	Ciechanów, Dobrocin, Iława, Jedwabno, Kwidzyń, Miłomłyn, Myszyniec, Nidzica, Nowe Ramuki, Płońsk, Przasnysz, Pułtusk, Srokowo, Strzałowo, Susz, Szczytno, Wichrowo, Wielbark, Wipsowo, Wyszków, Zaporowo,

1	2	3	4	5	6
7	Olsztyn	< 1	Dwukoły, Górowo Iławeckie, Kudypy, Młynary, Mrągowo, Olsztynek, Ostrołęka, Spychowo, Stare Jabłonki, Wipsowo,	< 1	Bartoszyce, Dwukoły, Elbląg, Górowo Iław., Kudypy, Lidzbark, Młynary, Mrągowo, Olsztynek, Ostrołęka, Ostrów Maz., Spychowo, Stare Jabłonki,
		1-2	Ostrów Mazowiecka		
8	Piła	0	Wronki, Złotów, Potrzebowice,	0	Potrzebowice, Wronki, Złotów,
		< 1	Okonek,	< 1	Durowo, Okonek,
		1-2	Durowo,	1-2	Jastrowie, Krzyż,
		2-5	Jastrowie, Krzyż, Wyrzysk, Zdrojowa Góra,	2-5	Wałcz, Wyrzysk, Zdrojowa Góra,
		5-10	Trzcianka	5-10	Sarbia
		10-15	Sarbia, Wałcz	10-15	Człopa, Trzcianka, Podanin,
		15-20	Podanin		
		> 20	Człopa, Mirosławiec	> 20	Mirosławiec
9	Poznań	0	Antonin, Babki, Gniezno, Góra Śląska, Grodzisc, Grodzisk, Jarocin, Karczma Borowa, Koło, Konin, Konstantynowo, Kościan, Krotoszyn, Lopuchówko, Obornik, Piaski, Pniewy, Przedborowo, Syców,	0	Babki, Gniezno, Góra Śląska, Grodzisc, Grodzisk, Jarocin, Karczma Borowa, Koło, Konin, Konstantynowo, Kościan, Krotoszyn, Oborniki, Piaski, Pniewy, Taczanów, Turek,
9	Poznań	0	Taczanów, Turek,	< 1	Lopuchówko, Przedborów, Syców,
				1-2	Antonin
10	Szczecin	0	Barlinek, Bogdaniec, Bolewice, Chojna, Dobrzany, Goleniów, Gryfice, Karwin, Lobez, Mieszkowice, Międzychód, Międzyrzecz, Międzyzdroje, Myślibórz, Nowogard, Ośno Lubuskie, Resko, Rzepin, Skwierzyna, Trzciel, Trzebiel,	0	Barlinek, Bogdaniec, Bolewice, Chojna, Goleniów, Karwin, Mieszkowice, Międzychód, Międzyrzecz, Międzyzdroje, Myślibórz, Nowogród, Ośno Lubuskie, Resko, Rokita, Rzepin, Trzciel, Trzebiel,
				< 1	Dębno, Gryfice, Gryfino, Kłodawa,

1	2	3	4	5	6
		< 1	Dębno, Gryfino, Kłodawa, Smolarz,		Skwierzyna, Smolarz,
		1-2	Kliniska,	2-5	Bierzwnik, Kliniska,
		2-5	Rokita,		
		40-45	Głuszko, Bierzwnik,	5-10	Lobez,
				25-35	Dobrzeny, Głuszko,
		> 70	Drawno	> 60	Drawno
11	Szczecinek	< 1	Czarne, Człuchów, Dretyń, Gościno, Leśny Dwór, Lębork, Manowo, Niedźwiady, Osusznica, Połczyn, Sławno, Szczecinek, Świdwin, Ustka, Wareino,	0	Niedźwiady,
				< 1	Białogard, Bobolice, Bytów, Czarne, Człuchów, Dretyń, Gościno, Lębork, Osusznica, Połczyn, Sławno, Szczecinek, Świdwin, Ustka,
11	Szczecinek	1-2	Białogard, Bobolice, Bytów,	1-2	Czaplinek, Manowo, Miastko, Leśny Dwór,
		2-5	Czaplinek, Miastko,	2-5	Wareino
		> 20	Drawsko, Złocieniec,	15-20	Złocieniec,
				> 20	Drawsko
12	Toruń	0	Brodnica, Cierpiszewo, Dąbrowa, Dobrzejewice, Gniewkowo, Golub-Dobrzyń, Osie, Runowo, Włocławek,	0	Cierpiszewo, Dąbrowa, Dobrzejewice, Gniewkowo, Golub-Dobrzyń, Lubichowo, Osie, Runowo, Zamrzenica,
		< 1	Bydgoszcz, Chocenowo, Czerek, Gdańsk, Gołąbki, Jamy, Kaliska, Kartuzy, Kościerzyna, Lubichowo, Mirosz, Przymuszewo, Różanna, Rytel, Skrwilno, Starogard, Strzebielino, Szubin, Tuchola, Wejherowo, Zamrzenica, Żołędowo,	< 1	Brodnica, Bydgoszcz, Chocenowo, Czerek, Gdańsk, Gołąbki, Jamy, Kaliska, Kartuzy, Kolbudy, Kościerzyna, Lipusz, Mirosz, Przymuszewo, Różanna, Rytel, Skrwilno, Starogard, Strzebielino, Szubin, Tuchola, Wejherowo, Włocławek, Żołędowo,
		1-2	Kolbudy, Lipusz,		
13	Wrocław	0	Bierutów, Milicz, Pieńsk, Świeradów, Węgliniec,	0	Bierutów, Duszniki, Węgliniec,
		< 1	Bardo Śl., Bolesławiec, Chocianów, Dębno, Duszniki, Głogówko, Grochowo,	< 1	Bardo Śl., Bolesławiec, Chocianów, Dębno, Głogówko, Grochowo, Legnica, Lubin, Miękinia,

1	2	3	4	5	6
13	Wrocław	<1	Legnica, Lubin, Ludwek, Miękinia, Oborniki, Oława, Rusnów, Świdnica, Złoteryja, Żmigród,	<1	Milicz, Oborniki, Oława, Piedsk, Rusnów, Świdnica, Świeradów, Złoteryja, Żmigród,
				3-5	Ludwek
14.	Zielona Góra	0	Bobrowice, Krzystkowice, Lipinki, Lubsko, Świebodzin, Zielona Góra,	0	Bobrowice, Krzystkowice, Lipinki, Lubsko, Nowa Sól, Świebodzin, Wolsztyn, Zielona Góra,
		<1	Bialków, Gubin, Krosno, Nowa Sól, Sława, Sulechów, Szprotawa, Torzym, Wolsztyn, Wymiarki	<1	Bialków, Gubin, Krosno, Sława, Sulechów, Szprotawa, Torzym, Wymiarki.

The great intensity in occurrence of secondary pine pests is in connection with the fact that in the spring and summer period a great amount of unbarked wood untreated by chemical insecticides is in the forest. This forms exceptionally good conditions for the breeding of various types of secondary pests, among which the most serious are gall wasps. In places, more than 20 gall wasps per m^3 were found in a drip-zone, whereas an occurrence of only 5 per m^3 is considered to be an occurrence that has threat for a forest. In the situation as it has been presented here, gall wasps, and especially the greater gall wasp (Blastophagus piniperda) must be treated as physiological pests, leading to a great reduction in needle growth due to their feeding, both supplementary feeding and regenerational feeding. This also causes a slowdown in the increase in tree mass, upon which so much of present forest economy depends. Gall wasps also find favorable conditions in tree stands neighboring on raw lumber storage facilities, where protective measures are either not carried out at all, or are not carried out in time. There also occurs in these kinds of places on a large scale the six-spiked pine engraver beetle (Ips sexdentatus), as well as the long-horned beetle (Acanthocinus aedilis).

In tree stands weakened by the action of root fungus, as well as in territories with disturbed water economies, and even in places in cities, where there is a strong thinning out of tree crowns by the nun moth caterpillars, increased and large-scale occurrences of the metallic wood-boring beetles (Phaenops cyanea) is also observed. Deserving of attention is information derived from, among other places, territories in Sielesia, that this pest has occurred recently to a significantly less degree than over the past several years in tree stands weakened by the effects of industrial air pollution.

Other kinds of secondary pests also have great significance, such as the polewood pine weevil (Pissodes piniphious), the pine weevel (Pissodes pini), the pine sawyer (Monochamus galloprovincialis), the striped ambrosia beetle (Trypodendron lineatum), horntails (Sirex spp.), as well as others. In trees that have been emptied of their resin and which remain on their trunks, there result increased occurrences of the sharp-spiked engraver beetle (Ips acuminatus). In places where an exceptional number of errors are made in the area of the removal of deadwood, of frequent occurrence is the borer beetle (Criocephalus rusticus), a serious technical pest.

Insufficiently active and inconsistent insect control measures against secondary pine pests will lead to a very serious worsening of the state of health of tree stands and to the occurrence n them of considerable damage.

The forest inspection jurisdictions must devote greater attention to the struggle against secondary pests than in the past. This must be more consistently carried out and carried out with greater effort, and protective measures must be instituted in a timely fashion, including the decortication of the lumber, as well as safeguarding it against infestation by means of chemical insecticides. Unstripped lumber that has not been sprayed by insecticides must not be left in the forest for the spring and summer periods. In places where terrain conditions allow, pains must be taken so that as much of the harvest of lumber as possible can be preserved in water. It is necessary to devote particular attention to tree stands weakened by the feeding of the nun moth, in which cultivation measures

and prevention cutting and clearing can be carried out until the regeneration of the lost needle cover. The removal of trees, during a period of gradation, that have been weakened but not suppressed by secondary pests leads merely to thinning out and gaps, but does not lead to a reduction in the number of pests in the wood stands. Good effects should come from a covering of large numbers of trap trees, assembled together in determined locations in the best possible manner, so that it would be possible to haul them away without searching for individual trees or logs through the forest. The rough trees from older age class tree stands should be hauled into younger and medium age class tree stands for the purpose of providing trap trees. The trapping capability of trap lumber laid out in this way is significantly greater than weakened trees designated inappropriately by certain forest keepers by the name of "standing trap trees."

32. Secondary spruce pests

In the period 1 October 1979 to 30 September 1980, a total of 462.2 thousand m^3 of spruce lumber suppressed by secondary pests was harvested (Table 36), that is, 5.9 thousand m^3 (1%) more than in the previous reporting period.

Just as in previous years, the greatest amount of infested lumber was harvested on the territory of the Katowice OZLP; this amounted to 181.0 thousand m^3, while in the previous year this was determined to be 197.8 thousand m^3. Significant amounts of infested lumber were harvested in the Wroclaw OZLP and the Bialystok OZLP, while in the Olsztyn OZLP, the situation was at the same level as in the previous year. In the rest of the District Administrations, less spruce deadwood was harvested than in the previous year. Great changes in the intensity of the occurrences of secondary pests have, in this respect, more of a local nature across the scale of the forest inspection jurisdictions as a whole, and sometimes even on the scale of a precinct or an individual forest district.

Most of the infested lumber was trap lumber, breakage, and uprooting, and the standing trees infested on the trunk amounted to only 19%.

There was 506.2 thousand m^3 of deadwood, broken trees, and uprooted trees remaining in the forest after 30 September 1980 for removal, and thus, this was more than resulting over the entire previous year. In comparison to the previous reporting period, there was an increase of 96.4 thousand m^3, that is, an increase of 23.5%. Of the indicated amount of lumber, 62.3 thousand m^3 was suppressed by secondary pests (57.3 thousand m^3 from the previous year), which amounts to 12% (14% from the previous year) of the overall amount of lumber remaining for removal from the tree stands in the autumn-winter period. In the individual State Forests District Administrations, changes were on the whole not great.

The total amount of lumber abandoned by secondary pests was determined to be 173.7 thousand m^3, which amounts to more than 34%, and the uninfested lumber, for the most part broken and uprooted trees, was estimated to be 270.2 thousand m^3, that is, 54% the overall amount of lumber left for removal. There was an important increase in the amount of uninfested lumber, but all the same, there was worsening of the state of health of tree stands in the OZLP's in Toruń (by twice), and Krośno (by twice), and in Wroclaw (by 1.3 times).

Because considerable reserves of secondary spruce pests are observed over the long period in many forest inspection jurisdictions in various parts of the country, there exists the constant danger of the outbreak of gradations in places where there are additional stimuli, especially on the part of abiotic factors, but also on the part of anthropogenic factors (for example, industrial gas and smoke), or biotic factors (for example, the nun moth); these additional stimuli can lead to the weakening of tree stands and a reduction in their resistance to diseases and pests. In only one forest inspection jurisdiction was the amount of infested harvested lumber over the course of the whole year greater than 20,000 m^3, and in two jurisdictions, it was 15,000 to 20,000 m^3; in nine forest inspection jurisdictions, it was 10,000 to 15,000 m^3, and in the rest of them, it was lower than 10,000 m^3 (Table 37). The greatest amounts of harvested, infested lumber was in the following forest inspection jurisdictions: Bialowieża (Bialystok OZLP);

Rudziniec, Kolonowskie, Ustroń, K dzierzyn, Turawa, and Rudy Rac. (Katowice OZLP); Limanowa (Kraków OZLP); Dobrzany (Szczecin OZLP); Szklarska Poręba, Śnieżka, and Świeradów (Wroclaw OZLP) (Table 37).

The most frequently indicated reasons for an increased occurrence of deadwood is high winds (tornadoes) (165 forest inspection jurisdictions) (Table 39), parasitic fungi, especially honey fungus and root fungus (111 forest inspection jurisdictions), and branch damage caused by snow (69). Factors such as disturbances in the water relationships and industrial emissions also have only very local significances (throughout 26 forest inspection jurisdictions), including as well low temperatures in the winter season, in the late autumn, and in the pre-spring season (13), as well as mining operations damage and damage caused by deer (throughout five forest inspection jurisdictions). In several tens of forest inspection jurisdictions in the northern section of the country, the nun moth has caused great thinning out of tree crowns, especially in undergrowth in the II level of mixed pine and spruce tree stands, and this favors an increase occurrence of bark beetles (borers, engraver beetles), especially an increase in the common engraver beetle (Pityogenes chalaographus).

In the tabulation presented in Table 39, no anthropogenic factors have been indicated, especially those resulting from not carrying out protective measures in a timely fashion, the leaving of great amounts of unstripped sawmill and stacked lumber in the forest during the winter and summer periods, errors in the area of carrying out nursery cultivation cutting and clearing operations, the untimely removal of deadwood, nor any serious, local neglect in the area of forest hygiene resulting mainly from a lack of labor forces for clearing and cutting, and due to poor wages.

In the period from 1 October 1979 to 30 September 1980, 1,774 thousand m^3 of broken tree and uprooted tree lumber was harvested throughout the entire country.

It can be seen from Table 40 that the basic situation in the [illegible]

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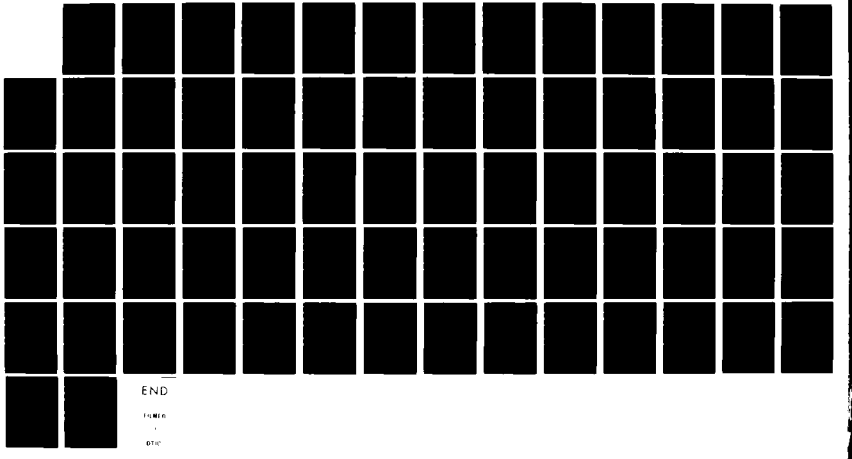

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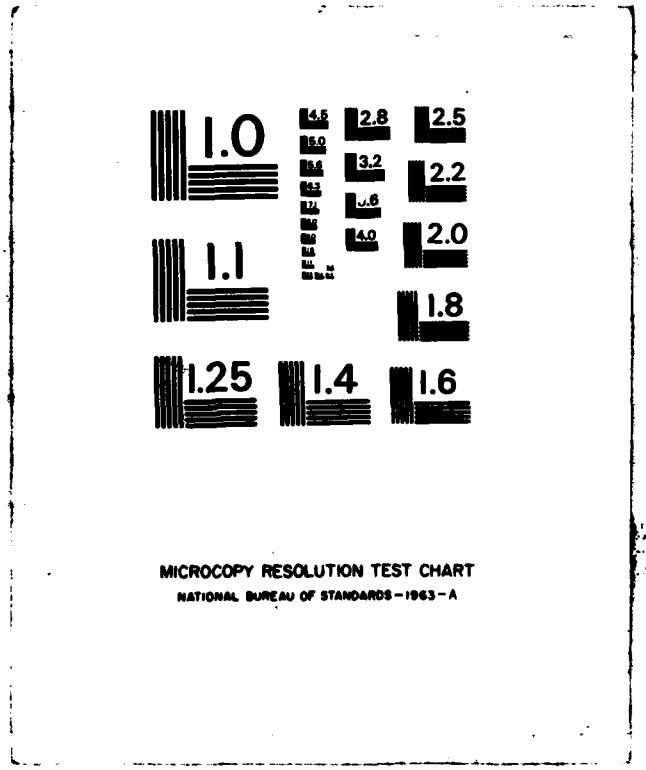
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the Wroclaw and Bialystok OZLP's is the worst, where at the beginning of the past fiscal year breakage and uprooting amounted to 60% of the overall amount of lumber remaining in the forest. For the period of the whole year, 177.4 thousand m^3 was harvested, and at the end of September 1980 there still remained 222.9 thousand m^3 in the forest. It was only in the Kamienna Góra, Świeradów, and the Waldrzych forest inspection jurisdictions (Wroclaw OZLP) that the amounts of broken and uprooted spruce tree lumber remaining in the forest at the end of September exceeded 10,000 m^3. In the rest of the forest inspection jurisdictions, the number of broken trees was significantly less (Table 41).

The territorial inspections carried out in the Sudeten showed that the condition of the spruce forests in that region is very bad, and the main reason for this stems from the increasing number of calamities of atmospheric origin and their consequences in the form of attacks by secondary pests. In some forest inspection jurisdictions, damages stemming from wind and snow accumulation on tree branches, coupled together with the lack of possibilities for doing away with these effects in a timely fashion, have led in various regions to the large-scale occurrence of cambiophages. In these cases, indeed, the situation is catastrophic. The increase, in certain places, of many open surface areas leads to the degradation of already poor forest environments and an increase in water erosion. In the spruce forests of the Sudeten Mountains, the negative influence of the industrially polluted air, which increases with each year, is more and more evident. In this territory, weakening of the trees as a result of the feeding of the larch bud moth, which has persisted for several years, has great significance.

In places where the weakening of the trees is greatest, the systematic and ongoing formation of great amounts of deadwood, amounting in certain places to 50% of all the trees in a tree stand and causing a reduction in stand density up to 0.3-0.4, has become evident recently. The subsequent link in the disease chain brings about a rapid increase in the numbers of spruce borer, bark, and engraver beetles.

Table 36. The course of control measures taken against secondary pests in spruce tree stands in the period from 1 October 1979 to 30 September 1980

Item No.	State Forests District Admin. [OZLP]	Lumber left in forest 9/30/79 in th. m^3	Amount wood harvested fm trees infested by secondary pests for follow. periods: X-III th.m^3	IV-VI th.m^3	VII-IX th.m^3	Total th.m^3	including standing trees th. pc.	including standing trees th.m^3	Area of harvested lumber thous. ha	Lumber left f/removal (incl. broken & uprooted) infested th.m^3	abandoned th.m^3	uninfested th.m^3	Total for 9/30/80 th. m^3
1.	Białystok	16.9	33,0	18,1	19,6	80,7	29,2	18,5	35,9	1,4	5,3	12,9	19,6
2.	Katowice	131,4	80,1	49,5	51,4	181,0	56,6	28,5	11,9	22,4	62,8	67,5	152,7
3.	Kraków	8.1	10,4	5,9	6,0	22,3	11,5	6,0	5,6	3,0	2,4	5,3	10,7
4.	Krosno	33,3	2,8	2,2	2,3	7,3	3,9	1,6	0,9	1,9	26,2	6,6	34,7
5.	Lublin	1,4	0,1	0,1	-	0,2	3,0	0,1	0,1	-	0,1	0,7	0,8
6.	Łódź	1,2	3,1	0,6	0,6	4,3	3,2	0,8	2,0	0,4	0,4	0,4	1,2
7.	Olsztyn	18,5	17,6	14,7	16,8	49,1	24,1	12,9	24,3	4,8	5,4	10,5	20,7
8.	Piła	3,2	1,7	0,8	1,4	3,9	1,7	0,8	0,6	0,8	1,1	1,7	3,6
9.	Poznań	5,0	3,5	2,4	1,0	7,0	1,8	0,8	1,1	1,2	2,4	1,3	4,9
10.	Szczecin	35,1	8,7	8,8	7,9	27,4	2,6	1,9	0,3	6,9	13,8	13,0	33,7
11.	Szczecinek	14,3	2,7	3,0	3,0	8,7	2,3	0,5	1,0	1,3	7,5	7,8	15,6
12.	Toruń	14,8	10,0	9,7	8,6	28,3	10,2	4,8	3,7	4,8	8,8	15,4	26,0
13.	Wrocław	127,4	4,8	24,4	34,5	63,7	28,4	16,9	3,4	13,3	40,0	128,9	130,2
14.	Zielona G.	0,7	0,2	0,1	-	0,3	0,5	0,1	-	0,1	0,5	0,2	0,8
	Total	411,9	189,8	141,3	151,1	482,2	179,0	91,1	90,3	62,3	173,7	270,2	506,2

[th = thousands; th. pc. = thousands pieces]

Table 37. Tabulation of forest inspection jurisdictions reporting an occurrence of secondary spruce pests

Item No.	State Forests District Admin. [OZLP]	Amt of infested harvested lumber	Forest inspection jurisdictions
1	2	3	4
1.	Białystok	0	Bielsk, Narew, Trzcianne, Łomża, Nowogród,
		<1	Rudka, Waliły, Rajgród, Augustów, Drygały, Ełk, Giżycko, Głęboki Bród, Pisz, Płaska, Szczebra
		1 - 2	Pomorze Suwalki,
		2 - 5	Browsk, Czarna Białostocka, Supraśl, Żednia, Borki, Czerwony Dwór, Gołdap, Mazkulińskie, Olecko,
		5 -10	Dojlidy, Hajnówka,
		10 -15	Białowieża
2.	Katowice	0	Koniecpol
		<1	Andrychów, Ujsoły, Węgierska G., Kłobuck, Złoty Potok, Katowice, Olkusz,
		1 - 2	Bielsko, Pruszków, Świerklaniec, Siewierz,
		2 - 5	Jaleśnia, Wisła, Suche-y Horby, Kozmęcin, Olesno, Kup, Namysłów, Strzelce Op., Tułowice, Brynek, Kobiór, Rybnik,
2.	Katowice	5 -10	Lublinice, Kluczbork, Kreuzejów, Brzeg, Prudnik,
		10 -15	Ustroń, Kędzierzyn, Turawa, Rudy Rac.,
		15 -20	Kolonowskie,
		>20	Rudziniec,
3.	Kraków	0	Baryez, Brzesko, Dąbrowa Tarnowska, Dębica, Gorlice, Gromnik, Jędrzejów, Kielce, Lagów, Lesie, Niepołomice, Ostrowice, Piłsudo, Rudo Malenieeka, Sterzchowice, Suchedniów, Włoszczowa,
		<1	Stary Sącz, Krzeszowice, Miechów, Nowojowa,
		1 - 2	Mydlenice, Pinczowa,

1	2	3	4
		2 - 5	Krościenko, Nowy Targ,
		5 -10	-
		10 -15	Limanowa
4.	Kraśne	0	Żmigród, Krasiczyn, Narol
		<1	Rzligród, Dukla, Komańcza, Lutowiska, Wetlina, Letnjak,
		1 - 2	Cisna,
		2 - 5	-
		5 -10	Lukasiewicze
5.	Lublin	0	Biała Podlaska, Biłgoraj, Chełm, Garwolin, Janów, Duża Stalowska, Józefów, Krasnystaw, Kraśnik, Staszów, Lubartów, Luków, Międzyrzec, Mińsk Mazowiecki, Mircze, Parczew, Puławy, Radzyń, Rozwadów, Rudnik, Sarnaki,
5.	Lublin	0	Siedlce, Sobibór, Strzałce, Świdnik, Tomaszów, Włodawa, Zwierzyniec,
		<1	Łochów, Sokołów
6.	Łódź	0	Piotrków,
		<1	Bełchatów, Brzeziny, Dobieszyn, Gostynin, Grotniki, Grójec, Kolumna, Poddębice, Sieradz, Spała, Wieluń,
		1 - 2	-
		2 - 5	Skierniewice
7.	Olsztyn	0	Ostrołęka, Ostróda Mazr., Przasnysz, Wyszków,
		<1	Ciechanów, Dobre Miasto, Działdowo, Elbląg, Ełk, Giżycko, Iława, Kętrzyn, Mrągowo, Nidzica, Piecki, Pułtusk, Szczytno, Wielbark,
		1 - 2	Iława, Jedwabno, Lidzbark, St. Jabłonki, Orzysz, Nowe Ramuki, Suwałki,
		2 - 5	Bartoszyce, Górowo Iławeckie, Kwidzyń, Mrągowo, Strzałowo, Susz, Wichrowo, Wipsowo, Zaporowo,
		5 -10	Olsztynek,
8.	Piła	0	-
		<1	Barowo, Jastrowie, Krzyż, Mirosławiec, Podanin, Trzcianka, Wałcz, Wronki, Wyrzysk, Złotów,

1	2	3	4
9.	Poznań	<1	Antonin, Babki, Gniezno, Góra Śląska, Grodzisc, Grodzisk, Jarocin, Karczma, Borowy, Konstantynowo, Kościan, Lopuchówko, Pniewy, Przedbórz, Syców, Turek,
		1 - 2	Krotoszyn,
		2 - 5	Pinski,
10.	Szczecin	0	Bolewice, Dębno, Drawno, Goleniów, Karwin, Międzychód, Ośno Lubuskie, Międzyrzecz, Rokita, Rzepin, Skwierzyna,
		<1	Barlinek, Bierzwnik, Bogdaniec, Głusko, Gryfice, Gryfino, Kliniska, Kłodawa, Mieszkowice, Międzyodrze, Myślibórz, Nowogard, Smolarz, Trzciel, Trzebiesz,
		1 - 2	Chojna
		2 - 5	Lobez, Resko,
		15 -20	Dobrzany
11.	Szczecinek	0	-
		<1	Białogard, Bobolice, Bytów, Czaplinek, Czarne Czł., Człuchów, Drawsko, Dretyń, Gościno, Łębork, Manowo, Miastko, Niedźwiady, Osusznica, Połczyn, Sławno, Szczecinek, Świdwin, Ustka, Wałcino
		1 - 2	Lodny Dwór, Złocieniec,
12.	Toruń	0	-
		<1	Bydgoszcz, Czerek, Gdańsk, Golub-Dobrzyń, Jasy, Kalisko, Kościerzyna, Lubichowo, Przymuszewo, Runowo, Rytel, Skrwilno, Szubin, Żołędowo,
		1 - 2	Chocmowo, Dąbrowa, Kartuzy, Strzebielino, Wejherowo,
		2 - 5	Brodnica, Kolbudy, Osie,
		5 -10	Starogard

1	2	3	4
13.	Wrocław	0	-
		<1	Bardo Śląskie, Bierutów, Grochowo, Jugów, Legnica, Milicz, Oborniki Śląskie, Oława, Ruszów, Złotoryja, Żmigród,
		1 - 2	Międzylesie, Miękinia, Pieńsk,
		2 - 5	Bystrzyca Kł., Duszniki, Jawor, Kamienna Góra, Lwówek Śl., Świdnica, Wałbrzych
		5 - 10	Starachocin,
		10 - 15	Szklarska Poręba, Śnieżka, Świeradów,
14.	Zielona	0	-
	Góra	<1	Gubin, Krosno, Lubsko, Nowa Sól, Sulechów, Wolsztyn,

Table 38. Selected tabulation of forest inspection jurisdictions according to amounts of spruce wood lumber infested by secondary pests and harvested in the period 1 October 1979 to 30 September 1980

Item No.	State Forests District Administration [OZLP]	Amount of harvested lumber (thous. m^3)								
		0	<1	1-2	2-5	5-10	10-15	15-20	>20	Total
		No. of forest inspection jurisdictions								
1.	Białystok	5	11	2	9	2	1	-	-	30
2.	Katowice	1	7	4	13	5	4	1	1	36
3.	Kraków	17	4	2	2	-	1	-	-	26
4.	Krosno	3	6	1	-	1	-	-	-	11
5.	Lublin	28	2	-	-	-	-	-	-	30
6.	Łódź	1	11	-	1	-	-	-	-	13
7.	Olsztyn	4	13	7	9	1	-	-	-	34
8.	Piła	-	10	-	-	-	-	-	-	10
9.	Poznań	-	15	1	1	-	-	-	-	17
10.	Szczecin	11	16	1	2	-	-	1	-	30
11.	Szczecinek	-	20	2	-	-	-	-	-	22
12.	Toruń	-	14	5	3	1	-	-	-	23
13.	Wrocław	-	11	3	7	1	3	-	-	25
14.	Zielona Góra	-	4	-	-	-	-	-	-	4
Total		70	145	28	47	11	9	2	1	313

Table 39. Reasons for increased occurrence of spruce deadwood in 1980

Item No.	State Forests District Administrat [OZLP]	Factors: Atmospheric: Tornadoes (hi winds)	Atmospheric: Frost	Atmospheric: Brnch damage from snow	Atmospheric: Disturb. in water economy	Industrial: Smoke	Industrial: Mining operat damage	Biotic: Deer	Biotic: Insects	Biotic: Fungi	Other
1.	Białystok	10	1	7	-	-	-	1	6	9	-
2.	Katowice	31	1	12	3	12	4	-	14	17	11
3.	Kraków	12	3	5	1	6	-	-	6	12	1
4.	Krosno	8	-	2	1	-	-	-	1	4	-
5.	Lublin	3	-	-	-	-	-	-	3	-	-
6.	Łódź	7	-	1	2	2	-	-	6	7	1
7.	Olsztyn	6	-	1	1	-	-	-	12	12	-
8.	Piła	6	-	5	1	-	-	-	7	3	3
9.	Poznań	24	-	-	4	-	-	-	20	16	3
10.	Szczecin	11	1	11	5	1	-	-	12	4	-
11.	Szczecinek	12	-	8	-	-	-	1	12	10	1
12.	Toruń	10	3	2	4	-	-	1	19	11	-
13.	Wrocław	23	4	15	1	5	1	2	14	6	-
14.	Zielona Góra	2	-	-	3	-	-	-	1	-	-
	Total	165	13	69	26	26	5	5	133	111	20

Table 40. Tabulation of broken and uprooted spruce trees from the period 30 September 1979 to 1 October 1980 (according to OZLP's)

Item No.	State Forests District Administ. [QZLP]	Lumber remaining in forest on 9/30/79: Amount in thous. m^3	Lumber remaining in forest on 9/30/79: % overall amt lumber remaining f/removal	Lumber harvested in per fm 10/1/79-9/30/80: Amount in thous. m^3	Lumber harvested in per fm 10/1/79-9/30/80: % overall amount of infested lumber	Lumber remaining for removal on 9/30/80: Amount in thous. m^3	Lumber remaining for removal on 9/30/80: % overall amount lumber left for removal
1.	Białystok	10,2	60,8	31,1	51,2	11,3	64,1
2.	Katowice	84,8	41,7	80,2	49,3	73,7	48,3
3.	Kraków	1,5	18,5	3,0	13,5	3,0	28,0
4.	Krosno	4,1	12,3	4,8	67,1	8,3	33,9
5.	Lublin	0,0	0,0	0,0	0,0	0,5	62,5
6.	Łódź	0,1	6,3	0,3	7,0	0,2	16,6
7.	Olsztyn	1,5	8,0	4,8	9,8	0,9	4,3
8.	Piła	0,6	19,4	0,9	22,5	0,7	19,4
9.	Poznań	0,1	2,0	0,0	0,0	0,3	6,1
10.	Szczecin	6,6	24,5	2,7	9,9	10,6	31,5
11.	Szczecinek	5,8	39,2	3,9	44,8	6,5	39,2
12.	Toruń	2,6	10,8	3,8	14,4	0,0	0,0
13.	Wrocław	70,4	62,3	32,8	51,5	106,3	80,0
14.	Zielona Góra	1,6	7,5	0,1	6,7	0,1	7,5
	Total	188,0	22,5	177,4	24,8	222,9	28,6

Table 41. Tabulation of broken and uprooted spruce trees infested by secondary pests in fiscal year 1979/80 (according to forest inspection jurisdiction)

Item No.	State Forests District Administration [OZLP]	Amt of wood harvested 10/1/79 to 9/30/80 thous. m^3	Forest inspection jurisdiction	Amt of lumber left on 9/30/80 thous. m^3	Forest inspection jurisdiction
1	2	3	4	5	6
1.	Białystok	0	Bielsk, Nurzec, Waliły, Lomża, Nowogród, Łomża, Drygały, Pisz, Szczebra, Ełk, Trzcianne	0	Bielsk, Nurzec, Trzciannc, Lomża, Nowogród, Drygały, Ełk, Olecko, Pisz, Szczebra
		<1	Browsk, Rudka, Rajgród, Augustów, Giżycko, Gł.Bród, Maskulińskie, Olecko, Pomorze, Płaska, Suwałki	<1	Białowieża, Browsk, Czarna Białostocka, Rudka, Supraśl, Waliły, Rajgród, Augustów, Borki, Czerwony Dwór, Giżycko, Gł. Bród, Gołdap, Maskulińskie, Pomorze, Płaska, Suwałki
		1-2	Czarna Białostocka, Supraśl, Gołdap		
		2-5	Białowieża, Żednia, Czerwony Dwór	1-2	Dojlidy, Żednia
		5-10	Dojlidy, Hajnówka		Hajnówka
2.	Katowice	0	Jeleśnia, Koniecpol,	0	Koniecpol
		<1	Andrychów, Bielsko, Ujsoły, Węgierska G. Sucha, Kluczbork, Olesno, Pruszków, Katowice, Olkusz, Świerklaniec, Sieviern, Złoty Potok	<1	Jeleśnia, Ujsoły, Węgierska G., Sucha, Herby, Kłobuck, Koszęcin, Olesno, Złoty Potok, Kluczbork, Pruszków, Namysłów, Katowice,
2.	Katowice	1-2	Wisła, Herby, Koszęcin, Kup, Kobiór, Rybnik	1-2	Olkusz, Świerklaniec, Sieviern, Andrychów Ustroń, Kędzierzyn, Tułowice, Rybnik
		2-5	Ustroń, Kędzierzyn, Kluczbork, Brzeg, Namysłów, Strzelce Op., Tułowice, Brynek, Rudy Rac.	2-5	Bielsko, Wisła, Kup, Kraciejów, Brzeg, Turawa, Kobiór, Rudy Rac., Prudnik, Lublinice
		5-10	Lublinice, Kraciejów, Prudnik, Turawa	5-10	Kolonowskie, Strzelce Op., Brynek, Rudzinice
		10-15	Kolonowskie, Rudzinice		

1	2	3	4	5	6
3.	Kraków	0	Saryusz, Brzesko, Dąbrowa Tarnowska, Dąbica, Gorlice, Gromnik, Jędrzejów, Kielce Krzeszowice, Lagów Lesie, Niepołomice, Ostrowice, Pińczów, Piwniczna, Ruda Maleniecka, Starachowice, Suchedniów, Włoszczowa	0	Saryusz, Brzesko, Dąbrowa Tarnowska, Dąbica, Gorlice, Gromnik, Jędrzejów, Kielce, Krzeszowice, Lagów, Lesie, Niepołomice, Ostrowice, Pińczów, Piwniczna, Ruda Maleniecka, Starachowice, Suchedniów, Włoszczowa.
		<1	Krościenko, Limanowa, Myślenice, Nawojowa, Miechów, Nowy Targ, Stary Sącz	<1	Krościenko, Limanowa, Myślinice, Nawojowa, Miechów, Nowy Targ. Stary Sącz
		2-5	Nowy Targ		
4.	Kreszo	0	Komańcza, Żmigród, Krasiczyn, Narol	0	Żeligród, Żmigród
		<1	Żeligród, Cisna, Dukla, Lutowiska, Wetlina, Leżajsk	<1	Cisna, Dukla, Lutowiska, Wetlina, Krasiczyn Narol, Leżajsk
		2-5	Lukasiewicze,	2-5	Komańcza, Lukasiewicze
5.	Lublin	0	Biała Podlaska, Biłgoraj, Chełm, Garwolin, Janów, Buda Stalowska, Józefów, Krasnystaw, Kraśnik, Staszów, Lubartów, Lachów, Luków, Międzyrzec, Mińsk Mazowiecki, Mircze, Parczew, Puławy, Radzyń, Rozwadów, Rudnik, Sarnaki, Siedlce, Sobibór, Sokołów, Strzelce Świdnik, Tomaszów Zwierzyniec.	0	Biała Podlaska, Biłgoraj, Chełm, Garwolin, Janów, Buda Stalowska, Józefów, Krasnystaw, Kraśnik, Staszów, Lubartów, Luków, Międzyrzec, Mińsk Mazowiecki, Mircze, Parczew, Puławy, Radzyń, Rozwadów, Rudnik, Sarnaki, Siedlce, Sobibór, Sokołów, Strzelce, Świdnik, Tomaszów, Włodawa, Zwierzyniec.
				<1	Lachów
6.	Łódź	0	Bełchatów, Dobieszyn, Kolumna, Pietrków, Poddębice, Spała, WZL, Zestynia	0	Bełchatów, Dobieszyn, Gostynin, Pietrków, Poddębice, Sieradz, Spała, Wieluń, WZL
		<1	Brzeziny, Grotniki, Grójec, Sieradz, Wieluń, Złoczew.	<1	Brzeziny, Grotniki, Grójec, Kolumna, Złoczew

1	2	3	4	5	6
7.	Olsztyn	0	Bartoszyce, Ciechanów, Dobrocin, Elbląg, Iława, Jedwabno, Kwidzyń, Lidzbark, Miłomłyn, Myszyniec, Nidzica, Ostrołęka, Ostrów Mazowiecki, Płońsk, Przasnysz, Pułtusk, Srokowo, Strzałowo, Susz, Szczytno, Wichrowo, Wielbark, Wyszków	0	Ciechanów, Dobrocin, Dywity, Iława, Jedwabno, Kwidzyń, Miłomłyn, Myszyniec, Nidzica, Ostrołęka, Ostrów Maz., Płońsk, Przasnysz, Pułtusk, Srokowo, St. Jabłonki, Strzałowo, Susz, Szczytno, Wichrowo, Wielbark, Wipsowo, Wyszków, Zaporowo
		<1	Dywity, Gurowo Ił., Kudypy, Młynary, Mrągowo, Nowe Ramuki, Spychowo, St.Jabłonki, Wipsowo, Zaporowo	<1	Bartoszyce, Elbląg, Górowo, Iławieckie, Kudypy, Lidzbark, Młynary, Mrągowo, Nowe Ramuki, Olsztynek Spychowo.
		1-2	Olsztynek		
8.	Piła.	0	Mirosławiec, Podanin, Trzcianka, Wronki, Złotów	0	Jastrowie, Podanin, Trzcianka, Wronki, Złotów
		<1	Durowo, Jastrowie Krzyż, Wałcz, Wyrzysk	<1	Durowo, Krzyż, Mirosławiec, Wałcz Wyrzysk.
9.	Poznań	0	Antonin, Babki, Gniezno, Góra Śląska, Grodzisc, Grodzisk, Jarocin Kaszcza Borowa, Konstantynowo, Kościan,Krotoszyn	0	Babki, Gniezno, Góra Śląska, Grodzisc, Grodzisk, Jarocin, Kaszcza Borowa, Konstantynowo, Kościan Krotoszyn, Lopuchówko, Pleszki, Pniewy, Turek.
	Poznań.		Lopuchówko, Pleszki, Pniewy, Przedborów, Syców, Turek.	<1	Antonin, Przedborów, Syców.
10.	Szczecin	0	Barlinek, Bogdaniec, Bolewice, Chojna, Dębno, Dobrzany, Drawno, Głusko, Goleniów, Gryfice, Gryfino, Karwin, Kliniska, Kłodawa, Nieszkowice, Międzychód, Międzyrzecz, Międzyzdroje, Myślibórz, Nowogard Ośno Lubuskie, Resko, Rokita, Rzepin, Skwierzyna, Trzciel, Trzebiel	0	Barlinek, Bogdaniec, Bolewice, Chojna, Dębno, Drawno, Głusko, Goleniów, Karwin, Nieszkowice, Międzychód, Międzyrzecz, Międzyzdroje, Myślibórz, Nowogard, Ośno Lubuskie, Resko, Rokita, Rzepin, Skwierzyna, Trzciel, Trzebiel

1	2	3	4	5	6
		<1	Bierzwnik, Smolarz	<1	Bierzwnik, Gryfice,
		2-5	Lobez		Gryfino, Kliniska, Kłodawa, Smolarz
				1-2	Lobez
				5-10	Dobrzany.
11.	Szczecinek	0	Człdchów, Niedźwiedzy	0	Człdchów, Niedźwiedzy
		<1	Białogard, Bobolice, Bytów, Czaplinek, Czarne, Drawsko, Dretyń, Gościno, Leśny Dwór, Lębork, Manowo, Miastko, Osusznica, Połczyn, Sławno, Szczecinek, Świdwin, Ustka, Warcino Złocieniec	<1	Białogard, Bobolice, Bytów, Czaplinek, Czarne, Drawsko, Dretyń, Gościno, Lębork, Manowo, Miastko, Osusznica, Połczyn, Sławno, Szczecinek, Świdwin, Ustka, Warcino, Złocieniec
		1-2		1-2	Leśny Dwór
12.	Toruń	0	Bydgoszcz, Dąbrowa, Golub-Dobrzyń, Kalinka, Lubichowo, Znanowo.	0	Bydgoszcz, Dąbrowa, Golub-Dobrzyń, Lubichowo, Osie, Znanowo
		<1	Brodnica, Chocenowo, Czersk, Gdańsk, Jasy, Kartuzy, Kościerzyna, Osie, Przysuszowo, Rytel, Skrwilno, Starogard, Strzebielino, Szubin, Wejherowo, Żołędowo	<1	Brodnica, Chocenowo, Czersk, Gdańsk, Jasy, Kalinka, Kartuzy, Kolbudy, Kościerzyna, Przysuszowo, Rytel, Skrwilno, Starogard, Strzebielino, Szubin, Wejherowo, Żołędowo
		1-2	Kolbudy		
13.	Wrocław	0	Bierutów, Grochowo, Janów, Legnica, Milicz, Oborniki,	0	Bierutów, Busków,
		<1	Bardo Śl., Jugów, Lwówek Śl., Międzylesie, Miękinia, Ożawa, Pieńsk, Ruszów, Złotoryja Żmigród	<1	Grochowo, Legnica, Miękinia, Milicz, Oborniki, Ożawa, Pieńsk, Żmigród
		1-2	Bystrzyca Kł., Strzechocin, Świdnica, Wałbrzych	1-2	Bardo Śl., Duszniki, Międzylesie, Złotoryja,
		2-5	Duszniki, Kamienna Góra, Świeradów	2-5	Bystrzyca Kłodzka, Strzechocin, Świdnica
		5-10	Szklarska Poręba, Śnieżka,	5-10	Jawor, Jugów, Lwówek Śl., Szklarska Por., Śnieżka
				10-15	Świeradów, Wałbrzych
				20	Kamienna Góra

1	2	3	4	5	6
14.	Zielona Góra	0	Gubin, Krosno, Lubsko, Wolsztyn	0	Krosno, Lubsko, Nowa Sól, Wolsztyn
		<1	Nowa Sól, Sulechów	<1	Gubin, Sulechów

It is expected that the process of deadwood formation will continue further, independent of any eventual disruption of larch bud moth gradation.

The range of types of spruce cambiophages and xylophages is similar to that in previous years. Most often met with and having the greatest economic significance is the engraver beetle (Ips typographus). Often accompanying him are the following: Ips amitinus and the common engraver beetle (Pityogenes chalcographus). In the mountains, especially in overcast locales, the striped ambrosia beetle (Trypodendron lineatum) requires special attention. However, he is not a rarity on the territories of the northeastern ranges of spruce. In large tree stands, the weevil (Pissodes harcyniae) is a frequent pest that results from industrial emissions.

In the previous year, taking into account the great amount of atmospheric precipitation as well as the relatively long period of cold in the summer, there were not overly favorable conditions for the development of secondary spruce pests, and especially for the development of the borer, bark, and engraver beetles. It is felt, however, that the reserves of these pests in spruce tree stands is relatively large, and in the case where there exist additional incitements, there may result, within a rapid time, a rapid densification of their populations. One of these incitements is the weakening of the spruce by the nun moth in the northern region of the country. Young trees completely stripped of their needle cover can be infested by various kinds of cambiophages, especially by the engraver bettle Polygraphus poligraphus and the common engraver beetle.

Unstripped raw spruce lumber imported into Poland from the far regions of the USSR requires special hylopathological supervision. This lumber may be

infested by various kinds of physiological and technical pests, including, among others, the fir sawyer (Monochamus urussovi) and the engraver beetle (Ips duplicatus). The spread of these pests is quite possible, especially to the regions of Lower Silesia, where the imported lumber is stored in the sawmills there. In the Karkonosz Mountains and in the Izerski Mountains, increased occurrences of secondary pests must be expected in tree stands weakened by the feeding of the larch bud moth.

In 1980 the use of sex pheromones was continued, with good results, for the insect control of engraver beetles. In 1981 this work will be continued in several tens of forest inspection jurisdictions.

Good effects were also achieved in the use of the rotational method for locating secondary spruce pests, both in lumber storage facilities, as well as in the forest. This method depends on taking lumber that has been recently harvested into areas where the infested lumber has been specified for suppression by a young generation of cockchafers or May bugs. This procedure does not have the purpose of controlling the pest, but only for localizing it within a selected area and for holding back the infested lumber until such time when it can be transported out of the threatened area, or else can be treated with chemical insecticides.

33. Secondary fir tree pests

In the period 1 October 1979 to 30 September 1980, all together 111.7 thousand m^3 of fir tree lumber suppressed by second insects was harvested in the country (Table 42). In comparison with the previous reporting period, there was an increase of 46.0 thousand m^3, or an increase of 69%, and in comparison with the situation two years ago, the increase was by 39.5 thousand m^3 (54%).

The greatest amounts of overall infested lumber were harvested on the territory of the Krośno OZLP (56%), and in the Kraków OZLP (37%).

Table 42. Course of insect control carried out against secondary pests in fir tree stands for the period 1 October 1979 to 30 September 1980

Item No.	State Forests Distr. Admin. [OZLP]	Lumber left in forest on 9/30/79 th.m³	Amount of harvested lumber fm trees infested by sec. pests for the periods: I-III th.m³	IV-VI th.m³	VII-IX th.m³	Total th.m³	including standing trees th.m³	th.m³	Area of harv. lumber thous. ha	Lumber left f/removal (incl. breakage & uprootings) infested th.m³	abandoned th.m³	not infested th.m³	Total 9/30/80 th.m³
1.	Katowice	2,0	2,4	0,8	0,8	3,8	0,8	0,4	0,1	0,1	1,3	1,0	2,4
2.	Kraków	32,2	24,3	7,1	9,6	41,0	8,1	3,6	3,0	2,8	3,3	19,8	26,1
3.	Krosno	45,8	32,2	16,0	14,0	62,2	12,9	6,9	11,1	9,0	19,5	137,5	166,0
4.	Lublin	2,8	1,0	0,9	1,0	2,9	1,4	0,7	1,3	1,3	2,3	1,4	5,0
5.	Łódź	0,9	1,1	0,5	0,2	1,8	0,8	0,2	0,4	0,2	0,3	0,4	0,9
	Total	83,5	61,0	25,3	25,4	111,7	23,8	11,8	15,9	13,5	26,7	160,2	200,4

[th = thousands]

In comparison with tabulations drawn up in prognoses for this year and the previous year, it may be seen that in all five OZLP's, in which fir occurs, there was an increase in the amount of lumber suppressed by secondary pests. This was seen most evidently on the OZLP territory in Krośno, where there was an increase in the removed amount of deadwood by 31,588 m^3, or an increase by 103%, and including in this there was an increase in breakage and uprooting by 27,849 m^3, that is, by 224%. In the Kraków OZLP, the changes were not so marked, that is, the overall amount of infested fir tree lumber increased by 36.5%, of which the overriding majority was due to breakage and uprooting (Table 42).

In comparison with the previous reporting period the amount of lumber remaining in the forest for removal up to 1 October 1980 increased significantly, that is, by 143%. The amount of this lumber was estimated by the forest inspection jurisdictions at 200.4 thousand m^3, whereas in the previous year, this amounted to 82.3 thousand m^3, and two years before that, 48.1 thousand m^3. Of the cited amount of lumber, 200.4 thousand m^3, 13.5 thousand m^3 (7%) comes from lumber infested by secondary pests, 26.7 thousand m^3 (13%) lumber abandoned by insects, that is barren deadwood, and 160.2 thousand m^3 (80%) of uninfested wood, for the most part, breakage and uprooting.

The greatest amounts of fir lumber infested by secondary pests were harvested in the following forest inspection jurisdictions (Table 43): Rymanów (Krośno OZLP), greater than 33 thousand m^3; Nawojowa (Kraków OZLP); 10-15 thousand m^3; Dukla and Lutowiska (Krośno OZLP), as well as Losie (Kraków OZLP), 5-10 thousand m^3. In the rest of the forest inspection jurisdictions, the amount of infested lumber did not exceed 5,000 m^3.

The increase in the harvested amounts of lumber infested by secondary pests, as well as the lumber qualifying for removal from tree stands and remaining in the forest up to 1 October 1980, has mostly to do with damage brought about by high winds, parasitic fungus, and snow breakage in the branches (Table 45). Industrial emissions, disturbances in the water ratios as a result, among other

things, of damages caused by mining operations, as well as the effects of low temperatures and other factors, also brought about locally the weakening of fir tree stands. In the Holy Cross Mountains, the bud worm Choristoneura muriana, which is locally accompanied also by other varieties of tortricid moths, contributed to the death of trees and the increase in the formation of fir deadwood. These insects in other regions of the country do not have great significance.

Considerable weakening of fir trees, in all the areas where it occurs, is in connection with the excessive thinning out of tree stands, which produces favorable conditions for destructive wind action, the straining of tree root systems, the occurrence of frost-ribs, as well as the thickening of secondary pest populations, which usually become eventually a link in the disease chain.

The numbers presented in Table 46 testify to the great extent of damage brought about in fir tree stands by winds and tornadoes. It may be seen from it that at the beginning of the reporting period under consideration there remained 38.1 thousand m^3 of broken and uprooted trees in the forest, 65.4 thousand m^3 was harvested for the whole year, and at the end of September 1980, there was more 150,000 m^3 still in the forest. The majority of this damage caused by breakage was the result of a tornado in August that moved across the territory of Northern Poland, among other places, where it caused especially great damage.

Among the secondary pests, the most frequent are the following: the fir weevil (Pissodes piceae) and the weevil Pityokteines curvidens. The feeding of another fir beetle, Cryphalus piceae, is having greater and greater significance; this insect was known up until recently to infest the branches and treetops, but recently it has been encountered several times at various tree heights, as well as in lumber remaining in the forest during the spring and summer periods; horntails (Sirex spp.) and the common timber worm (Hylecoetus dermestoides) are technical pests met with locally quite numerously on fir deadwood.

In the control for secondary fir pests, great attention should be turned

primarily to pulling away unstripped lumber to prevent it from being infested by cambiophages and xylophages, as well as to processing broken and uprooted trees as quickly as possible after the damage occurs.

Table 43. Tabulation of forest inspection jurisdictions reporting the occurrence of secondary fir pests

Item No.	State Forests District Admin. [OZLP]	Amt of infested lumber harvested thous. m^3	Forest inspection jurisdictions
1	2	3	4
1.	Katowice	<1	Kup, Pruszków, Nowysłów, Tułowice, Olkusz
		1 - 2	Andrychów
		2 - 5	Prudnik
2.	Kraków	0	Dąbrowa Tarnowska, Jędrzejów, Krościenko, Krzeszowice, Niepołomice, Ostrowice, Pińczów, Włoszczowa.
		<1	Bochnia, Dębica, Miechów, Myślenice, Nowy Targ, Ruda Maleniecka, Starachowice, Stary Sącz,
		1 - 2	Brzesko, Grodnik, Limanowa, Piwniczna, Suchedniów
		2 - 5	Gorlice, Kielce, Lagów,
		5 - 10	Lesko,
		10 - 15	Nowojowa
3.	Krosno	0	-
		<1	Brzegi Dolne, Kołaczyce, Komańcza, Lesko, Lukasiewicze, Żmigród, Kańczuga, Narol, Kolbuszowa, Leżajsk,
	Krosno	1 - 2	Boligród, Birczna, Dynów, Strzyżów,
		2 - 5	Brzozów, Krościenko,
		5 - 10	Dukla, Lutowiska,
		10 - 15	-
		15 - 20	-
		>20	Rymanów,

1	2	3	4
4.	Lublin	0	Biała Podlaska, Buda Stalowska, Chełm, Garwolin, Kraśnystaw, Krudnik, Lubartów, Łaczna, Łuków, Międzyrzec, Nidek Mas., Mirosz, Parczew, Puławy, Radzyń, Rykowódz, Sarnaki, Siedlce, Sobibór, Sokołów, Strzelce, Świdnik, Włodawa
		<1	Biłgoraj, Józefów, Stasz6w, Rudnik, Tomaszów, Zwierzyniec,
		1 - 2	Janów,
5.	Łódź	0	Spała,
		<1	Brzeziny, Gretniki, Kozienice, Piotrków, Przysucha, Radom, Radomsko, Sieradz, Skarżysko, Złoczew.

Especially important is carrying out nursery cutting and the clearing and cutting operations in a timely fashion and removing only deadwood. Clearing away weakened trees will only result in the occurrence of excessive thinning out and gaps in the trees, will worsen the health conditions of the tree stands, and will result in the increased formation of deadwood.

Table 44. Selected tabulation of forest inspection jurisdictions according to the amount of fir tree lumber infested by secondary pests and harvested from 1 October 1979 to 30 September 1980

Item No.	State Forests District Admin. [OZLP]	Amount of harvested lumber (thousands m³) No. of forest inspection jurisdictions							
		0	< 1	1-2	2-5	5-10	10-15	> 20	Total
1.	Katowice	-	5	1	1	-	-	-	7
2.	Kraków	8	8	5	3	1	1	-	26
3.	Krosno	-	10	4	2	2	-	1	19
4.	Lublin	23	6	1	-	-	-	-	30
5.	Łódź	1	10	-	-	-	-	-	11
6	Total	32	39	11	6	3	1	1	93

Table 45. Causes for increased occurrence of fir deadwood in 1980

Item No.	State Forests District Admin. [OZLP]	Factors									
		Atmospheric				Industrial		Biotic			Other
		Torna-does	Frost	Snow damage	Disrupted water economy	Smoke	Mining oper. damage	Deer	In-sects	Fun-gi	
		No. of forest inspection jurisdictions									
1.	Katowice	4	1	2	-	3	2	-	3	2	2
2.	Kraków	6	-	2	-	3	-	-	6	8	-
3.	Krosno	18	1	9	1	-	-	-	2	7	-
4.	Lublin	6	-	1	-	-	1	-	2	3	2
5.	Łódź	5	-	1	2	3	-	-	5	1	-
Total		38	2	15	3	9	3	-	18	21	4

Table 46. Tabulation of broken and uprooted fir trees from the period 30 September 1979 to 1 October 1980 (according to OZLP's)

Item No.	State Forests District Administrations [OZLP]	Lumber remaining in forest on 9/30/79		Lumber harvested in per. 10/1/79-9/30/80		Lumber remaining for removal on 9/30/80	
		Amount in th.m^3	% overall amt lumber remaining f/removal	Amount in th.m^3	% overall infested lumber	Amt in th.m^3	% overall amt lumber remaining f/removal
1.	Katowice	0,6	28,6	0,5	13,2	0,4	16,7
2.	Kraków	19,1	59,3	24,3	59,1	14,4	53,7
3.	Krosno	18,2	39,2	40,3	64,8	134,6	61,2
4.	Lublin	0,0	0,0	0,1	3,8	0,3	6,0
5.	Łódź	0,2	28,0	0,2	11,1	0,3	37,5
Total		38,1	30,4	65,4	30,4	150,2	30,0

[th = thousands]

C. DECIDUOUS TREE PESTS

The pests belonging to this group are included under special prognostication methods, and the information concerning their occurrences is tabulated primarily on the basis of report cards. They are partially supplemented by flag cards and reports from territorial inspections carried out by workers of the Forest Protection Associations, as well as of the Forestry Research Institute.

Insect control methods carried out against insect pests in deciduous tree stands are carried out only after previous coordination with the Forestry Research Institute.

34. Ugly-nest tortricids (Tortrix viridana L.)

This insect likes to attack oak tree stands of older age classes. Its occurrence in our forests has the character of a regional gradation.

In 1980 the appearance of the ugly-nest tortricids was reported in 104 forest inspection jurisdictions based on all OZLP's, with the exception of the Pila OZLP. This pest occurred across relatively large areas in the Katowice, the Poznań, and the Wroclaw OZLP's (Table 47).

Table 47. Tabulation of area of occurrence of the pine shoot moth (Tortrix viridana L.) on the territories of individual forest inspection jurisdictions in 1980

State Forests District Admin. [OZLP]	Total area of occurrence	Forest inspection jurisdiction, area of occurrence in ha
1	2	3
Bialystok	11	Borki 1, Nik 10, Lomza
Katowice	10 828	Andrychów 400, Bielsko 193, Brynek 1000, Brzeg 1000, Katowice 881, Kędzierzyn 100, Kluczbork 316, Kobiór 880, Konieczpol 40, Koszęcin 30, Lasy 241, Lubliniec 30, Namysłów

1	2	3
		81, Olesno 8, Prószków 810, Prudnik 246, Rudziniec 367, Rudy Rac. 2800, Rybnik 559, Sieraiers 46, Suche 80, Strzelce 554, Świerklaniec 55, Tułowice 1683, Turawa 5, Ustroń 12, Złoty Potok 127
Kraków	3 187	Brzesko 717, Dąbrowa Tarn. 20, Krzeszowice 80, Mydlniec 800, Niepołomice 1600
Krosno	1 068	Kolbuszowa 20, Kołaczyce 120, Lesko 119, Olszyce 300, Sieniawa 480
Lublin	7 627	Biała Podl. 200, Chełm 1780, Krasnik 200, Lubartów 100, Łochów 300, Parczew, Puławy 300, Sarnaki 700, Siedlce 28, Sobibór 1, Strzelec 2800, Świdnik 1350, Tomaszów 42
Łódź	28	Wieluń 28
Olsztyn	8 200	Bobrowin 1000, Elbląg 28, Górowo Iławeckie 800, Kwidzyń 40, Młynary 1000, Nowe Ramuki 35, Orzechowo 800, Susz 3000, Wichrowo 800, Zaporowo 1800
Poznań	9 804 bory do 30 % - 480 31-60%- 6347 powyżej 60 % - 2977	Babki 71, Gniezno 1040, Góra Śląska 800, Grodzisk 34, Jarocin 120, Kalo 300, Konin 95, Konstantynowo 14, Krotoszyn 3000, Lopuchówko 270, Oborniki 240, Piaski 2000, Pniewy 100, Przedborów 65, Syców 45
Szczecin	406	Bolewice 300, Rzepin 105, Smolarz 1
Toruń	1 343	Gdańsk 15, Golub-Dobrzyń 10, Jany 60, Mirodn 1000, Rumia 118, Wrocławek 120
Wrocław	19 824	Bardo Śl. 800, Bolesławiec 418, Chociemice 300, Dąbno 2003, Grochowo 300, Jawor 700, Kamieniec Góra 30, Legnica 3000, Lubsko Śl. 1800, Miękinia 700, Milicz 882, Oborniki Śl. 1181, Otmuchów 3000, Rudawa 581, Szklarska Poręba 46, Śmiechów 119, Świdnica 1378, Świerzawa 128, Wałbrzych 276, Wołczyn 1105, Żmigród 818
Zielona Góra	1 206	Nowa Sól 800, Sulechów 116, Wolsztyn 40, Zielona Góra 250
Total	63 208	111 forest inspection jurisdictions

The total area of oak tree stands damaged by this pest in 1980 amounted to 63,303 ha, that is, 51,698 ha (82%) greater than in the previous year. A comparison of data from recent years shows that the ugly-nest tortricids caused damage to oak tree stands in varying degrees in 1980 across surface areas more significant than have been noted in Poland for the last 25 years. The greatest occurrence took place for the following years: 1959, 35,628 ha; 1961, 25,042 ha; 1968, 29,526 ha; 1972, 32,179 ha; and in 1980, 63,303 ha. The feeding of this pest has been observed also in the "Dębniak" and the "Przekop" reservations on the territory of the Lublin OZLP. Generally damaged tree stands, even those that had been damaged to a great degree, will regenerate their lost assimilational apparatus after about six weeks. With this in mind, chemical recovery operations in oak forests are carried out only in individual cases (for example, in seed-production tree stands, in recreational areas, or those that have been subject to infestation for a series of successive years, where it is possible that trees with withered crowns may appear).

For 1981 it is projected that there will be insect control measures against the ugly-nest tortricids in seed-production oak tree stands, among others, on the OZLP territories of Zielona Góra forest inspection jurisdiction across an area of about 100 acres, as well as on the territory of the Wroclaw OZLP in the following forest inspection jurisdictions: Dębno, about 200 ha; Obornika, about 70 ha; Olawa, about 140 ha; and Żmigród, about 60 ha. For the Wroclaw and Zielona Góra OZLP's, the total will be in the area of about 570 ha.

The insecticides cited in Table 62 can be used for control measures against this pest.

35. The gypsy moth (Lymantria dispar L.)

In 1980 the occurrence of the gypsy moth was reported in the following forest inspection jurisdictions: Rajgród and Trzcianne in the Bialystok OZLP, where the pest occurred across an area of about 1,600 ha, primarily in birch and

alder tree stands; other forest inspection jurisdictions were Jamy (Toruń OZLP), about 50 ha; Oborniki (Wroclaw OZLP), about 5 ha; in the Trzcianka forest inspection jurisdiction (Pila OZLP), the occurrence of this pest was observed only in trees growing along public thoroughfares. According to identifications carried out by the Forest Protection Association in Gdańsk on the territory of the Trzianka forest inspection jurisdiction, both in the state forests and in the non-state forests, this pest made an appearance in a dispersion that resulted in only a weak degree of feeding. In addition, quite large numbers of dead gypsy moth caterpillars, presumably killed by undetermined microorganisms, were found on the sprouts, trunks, and in places, even on undergrowth. In addition, in the Rajgród forest inspection jurisdiction, dead caterpillars were found that had been killed by parasitic insects from the Ichneumonoidea family, presumably by braconid wasps.

Insecticides for insect control were not used.

36. Lasiocampid moths (Malacosoma neustria L.)

This insect occurs sometimes in forests, mainly on oak, hornbeam, and poplars.

In 1980, the occurrence of this pest was reported from the Choczewo forest inspection jurisdiction (Toruń OZLP), where the area affected was about 50 ha. No insect control measures were carried out.

37. Geometrid moths (Geometridae)

The following have had the greatest significance over the years: the winter moth, the winter sower moth, and Hibernia defoliara, which are all polyphagous, feeding on several types of trees and deciduous shrubs.

In 1980 the occurrence of geometrid moths was reported in 57 forest

inspection jurisdictions based on all OZLP's, with the exception of the Pila and Wroclaw OZLP's.

The total area of oak tree stands damaged in 1980 amounted to 38,902 ha, that is, about 33,000 ha (85%) more than in the previous year.

Tree stands that had been thinned out, even to an extensive degree, regenerated their lost assimilational apparatus after about six weeks.

Chemical protective measures were not undertaken.

Table 48. Tabulation of area of occurrence of geometrid moths on the territories of individual forest inspection jurisdictions in 1980

State Forests District Admin. [OZLP]	Total area of occurrence, in ha	Forest inspection jurisdiction, area of occurrence in ha
1	2	3
Białystok	11 740	Borki 750, Bielsk Podlaski 40, Browsk 300, Czarna Białostocka 400, Czerwony Dwór 4000, Gibyeko 450, Goldap 250, Lomża 1200, Radka 750
Katowice	54	Brynek 6, Konicepol 49
Kraków		Kielce, Przysucha
Krosno	2 920	Głogów 200, Krasiczyn 2500, Mielec 20, Sieniawa 200
Lublin	7 484	Biała Podlaska, Chełm 1780, Garwolin 80, Kraśnik 260, Lubartów 100, Łochów 300, Międzyrzec 300, Puławy 700, Sarnaki 110, Siedlce 25, Sobibór 10, Strzelce 2800, Świdnik 1080, Tomaszów 200
Łódź	896	Dobieszyn 80, Gostynin 300, Konieniec, Płock pjd, Radom, Spała 400, WSL 116

1	2	3
Olsztyn	10 194	Ciechanów 100, Dwukoły 1250, Kwidzyń 30, Lidzbark 3500, Nowe Ramuki 349, Olsztynek 700, Pułtusk 6, Srokowo 500, Susz 3250, Zaporowe 500
Poznań	173	Bobki 3, Gniezno 170, Koło
Szczecin	3 447	Barlinek 1000, Bolewice 300, Dębno 200, Dobrzany 286, Międzyzdroje 101, Nowogard 1560
Szczecinek	21	Lębork 11, Sulechów 10
Toruń	1 994	Dąbrowa, Golub-Dobrzyń 680, Jany 820, Kartuzy 300, Kolbudy 49, Szubin 100, Włocławek 45
Zielona Góra	10	Sulechów
Total	38 902	57 forest inspection jurisd.

38. Beech scale (Cryptococcus fagi Dougl.)

This insect attacks primarily trunks, branches, and exposed beech roots.

In 1980, the occurrence of beech scale was reported from the territories in the Szczecin OZLP. Beech scale has occurred for many years in the following forest inspection jurisdictions: Dobrzany, an area of 2,000 ha; Gryfice, 75 ha; and Gryfino, 650 ha.

No insect control measures were carried out.

39. Alder leaf beetle (Agelastica alni L.)

In 1980 the occurrence of the alder leaf beetle was reported in the Borki forest inspection jurisdiction (Bialystok OZLP), where this insect appeared in a nursery over an area of 0.13 ha, as well as in the Ośno Lubuskie forest

inspection jurisdictions (Szczecin OZLP) across an area of 1 ha.

Insect control measures across a total area of 1.13 ha were carried out using contact insecticides.

40. The poplar and willow borer (Cryptorhynchus lapathi L.)

In 1980 the occurrence of the poplar and willow borer was reported in the Mielec forest inspection jurisdiction (Krosno OZLP), where it showed up in an alder free field planted in 1975, across an area of about 2 ha. Damage to the trees amounted to 30%.

No control measures were carried out.

Poplar pests:

41. The threat to poplar plantations by technical pests

In 1980 damage from xylophages across a total area of about 4,900 ha was confirmed. In comparison with the year 1979, there was a further drop in the amount of area of poplar plantations threatened by technical pests (by about 800 ha, that is, 14%).

The threat from the aspen hornet clearwing moth increased. This pest, however, has the least economic significance for the future, and the total area of threat from it does not exceed 100 ha.

From data forwarded by the forest inspection jurisdictions, it emerges that chemical measures for insect control against technical poplar pests were carried out in 1980 for a total area of about 2,000 ha. These measures were carried out mainly against the worst technical pest for poplars, the poplar borer. Insect control operations against the aspen borer and the poplar hornet clearwing moth

were also carried out, but generally not across great areas. The average effectiveness of these measures amounted to 70-80%. In some entities, complete effectiveness was reached (100%). In some entities, on the other hand, insect control measures had absolutely no effects at all.

Many forest inspection jurisdictions carried out no insect control measures against technical poplar pests. The most frequent reasons given for this were a lack of chemical means or water flooding of the poplar plantations. No information was received from a series of forest inspection jurisdictions concerning insect control measures carried out against poplar pests.

In recent years there has been observed a drop in the amount of surface area of plantations threatened by technical pests; however, this cannot be a reason for too much optimism. This is so, because the amount of plantation area on which, despite the existing threat, the planned insect control measures are not being carried out, is increasing with a significantly greater rate of development. The increasing tendency in connection with a dearth of information concerning insect control measures carried out in many forest inspection jurisdictions, seems to indicate that the "fashion" for poplar plantations is passing, and the interest in them on the part of the forest inspection jurisdictions is decreasing. Problems connected with nursery cultivation and the protection of poplar plantations require, thus, new and more rapid control.

42. The poplar borer (Saperda carcharias L.)

In 1980, this pest occurred across the territories of 129 forest inspection jurisdictions in 13 State Forest District Administrations (no data were received from the Bialystok OZLP) across a total area of 4,587 ha (Table 49). In comparison with the year 1979, the area of threat across a comparable area decreased by 920 ha (16%).

The small increase in the area of threat was somewhat greater in the Kraków

OZLP and in the Toruń OZLP. In the rest of the State Forest District Administrations, the area of threat decreased.

The intensity of the occurrence of this pest was in general not great. Ninety-eight percent of the overall area of threat (that is, 4,521 ha) was composed of a plantation of an older age class (greater than four years), in which the number of infested poplars amounted to about 10% on the average, and in none of these entities did this rate exceed 50%. Great intensity in the occurrence of the poplar borer (more than half of all suppressed poplars) was confirmed on 24 ha of plantation.

It is forecast that for 1981 chemical control will be carried out against the poplar borer across the entire area of threat, that is, 4,587 ha. The insect control measures will be carried out using a preparation of Lebaycid in a concentration of 10%.

43. The aspen borer (Saperda populnea L.)

In 1980, the occurrence of this pest was confirmed on the territories of 21 forest inspection jurisdictions in nine State Forest District Administrations across a total area of about 240 ha (Table 50).

Threat on the part of the aspen borer was not determined in the Kraków, Łódź, Pila, and Wroclaw OZLP's, and no data were forwarded from the Bialystok OZLP.

In comparison with 1979, the area of threat decreased by 19.58 ha (7%). The greatest number of plantations threatened by this pest in 1980 was in the Toruń OZLP, on the territory of which in the previous year, that is 1979, no threat at all was indicated. A significant increase in damage was noted also in the Olsztyn OZLP.

Table 49. Projected occurrence of poplar borer (<u>Saperda carcharias</u> <u>L</u>.) in 1981

Item No.	State Forests Dis.Ad. [OZLP]	Forest inspection jurisdiction	No. FIJ / No. tree stds	Area of threat in ha: up to 4 yrs, to 10 %	up to 4 yrs, 10-30 %	up to 4 yrs, over 30 %	over 4 yr, to 30 %	over 4 yr, over 30 %	Total
1	2	3	4	5	6	7	8	9	10
1.	Białystok	lack of data							lack of data
2	Katowice	Brynek, Brzeg, Gidle, Kluczbork, Kłobuck, Kobiór, Koniecpol, Koszęcin, [illegible], Namysłów, Prudnik, Rudy Raciborskie, Rybnik, Tułowice, Złoty Potok	[illegible]	-	-	-	303	4	307
3	Kraków	Dąbrowa Tarnowska, [illegible]	[illegible]	-	-	-	67	-	67
4	Krosno	Głogów, [illegible], Narol, Oleszyce	[illegible]	-	-	-	176	1	177
5	Lublin	Buda Stalowska, Biała Podlaska, Chełm, Józefów, Krasnystaw, Kraśnik, Lubartów, Łochów, Łuków, Międzyrzec, Mińsk Maz., [illegible], Parczew, Puławy, Radzyń Podl., Sobibór, Sokołów, Strzelce, Świdnik, Tomaszów Lub., Włodawa, Zwierzyniec	[illegible]	20	6	-	1012	5	1047
6	Łódź	Dobieszyn, Gostynin, Kozienice, Łąck, Piotrków, Płock, Poddębice, Radomsko, Skierniewice, Spała, Wieluń, Złoczew, [illegible]	[illegible]	-	-	-	264	-	264
7	Olsztyn	Bartoszyce, Elbląg, Miłomłyn, Młynary, Mrągowo, Ostróda Maz., Pułtusk, Stare Jabłonki, [illegible]	[illegible]	4	-	-	542	-	546
8	Piła	Wałcz	[illegible]	-	-	-	4	-	4
9	Poznań	Grodzisk, Karczma Borowa, Łopuchówko	[illegible]	4	-	-	67	-	71
10	Szczecin	Barlinek, Bolewice, Chojna, Dębno, Dobrzany, Goleniów, Gryfice, Kłodawa, Myślibórz, Resko, Smolarz, Trzciel	[illegible]	-	-	-	300	-	300
11	Szczecinek	Bytów, Czarne Człuch., [illegible], Gościno, [illegible], Szczecinek, Świdwin	[illegible]	-	-	-	66	-	66
12.	Toruń	Brodnica, Bydgoszcz, Cierpiszewo, [illegible], Dąbrowa, Dobrzejewice, Gdańsk, [illegible], Golub-Dobrzyń, Gołąbki, [illegible], Kolbudy, [illegible], Osie, [illegible], Rytel, [illegible], Starogard, Strzebielino, [illegible], Wejherowo, Włocławek, [illegible]	[illegible]	-	4	-	818	1	823
13	Wrocław	[illegible], [illegible], [illegible], Głogówko, Legnica, [illegible], Lądek Zdr., [illegible], Oława, [illegible], [illegible], Żmigród	[illegible]	-	-	-	266	13	279
14	Zielona Góra	Krzystkowice, Lubsko, Nowa Sól, Sulechów, Świebodzin, Zielona Góra	[illegible]	-	-	-	67	-	67
	Total		[illegible]	34	8	-	4081	34	4307

[FIJ = forest inspection jurisdictions]

Table 50. Forecast occurrence of aspen borer (Saperda populnea L.) in 1981

Item No.	OZLP*	Forest inspect. jurisdic.	No. of FIJ	Area of threat in ha						Total
				up to 4 yrs			over 4 yrs			
			No. tree fldg	to 10 s	10 - 20 s	over 20 s	to 10 s	10 - 20 s	over 20 s	
1.	Katowice	Katowice	1/3	-	1,70	-	-	-	-	1,70
2.	Krosno	Olesnyce	1/3	-	-	-	6,00	2,00	-	8,00
3	Lublin	Lubartów	1/3	-	-	-	-	14,41	-	14,41
4	Olsztyn	Elbląg, Saperowo	1/3	-	-	-	60,34	4,14	-	64,48
5	Poznań	Szczecinek Dorowo	1/3	-	3,74	-	-	-	-	3,74
6	Szczecin	Barlinek, Chojna, Gryfice, Kliczkowo, Recko	1/11	-	-	-	40,00	-	-	40,00
7	Szczecinek	Bytów, Lotzy Dwór, Szczecinek	1/4	-	-	-	8,02	-	-	8,02
8	Toruń	Brodnica, Golub-Dobrzyń, Golubki, Jany, Przymuszewo, Strzebielino	1/12	-	-	-	68,81	-	-	68,81
9.	Zielona Góra	Świebodzin	1/4	-	-	-	19,96	-	-	19,96
Total			11/40	-	5,44	-	213,01	21,15	-	239,60

*OZLP: State Forests District Administrations

Note: In four State Forest District Administrations (Kraków, Łódź, Pila, and Wroclaw) no threat was determined. There is a lack of data from the Bialystok OZLP.

It is recommended that in 1981 insect control measures against this pest be carried out across the entire area of occurrence (about 240 ha) by cutting out dead shoots and branches or by chemical means, smearing afflicted areas with a 10% solution of Lebaycid.

44. The poplar hornet clearwing moth (Paranthrene tabani formis Rott.)

In 1980, this pest occurred across the territories of 13 forest inspection jurisdictions in seven State Forest District Administrations, for a total area of about 200 ha (Table 52). Threat on the part of the poplar hornet clear wing moth was not confirmed in the Krośno, Lublin, Łódź, Olsztyn, Poznań, and Wroclaw OZLP's, and no data were forwarded from the Bialystok OZLP. In comparison with 1979, the area of threat decreased by 92.30 ha (31%). The greatest threat was

Table 51. Forecast occurrence for the aspen hornet clearwing moth (Aegeria apiformis) in 1981

Item No.	OZLP*	Forest inspect. jurisdic.	No. of FIJ No. tree flds	Area of threat in ha: up to 4 yrs to 10 %	up to 4 yrs 10-30 %	up to 4 yrs over 30 %	over 4 yrs to 10 %	over 4 yrs 10-30 %	over 4 yrs over 30 %	Total
1	2	3	4	5	6	7	8	9	10	11
1.	Krosno	Krosno, Pilzno	2/3	-	-	-	-	8,05	-	8,05
2.	Lublin	Biala Podlaska, Chelm, Lubartow	2/3	-	-	-	12,20	8,00	-	10,00
3	Olsztyn	Stare Jabtonki	1/2	-	-	-	8,00	-	-	8,00
4	Pila	Walcz	1/2	-	-	-	1,41	0,80	-	2,21
5	Szczecinek	Gryfice	1/2	-	-	-	30,00	-	-	30,00
6	Torun	Brodnica, Bydgoszcz, Swiecie	3/4	-	-	-	6,00	0,76	-	7,00
7	Zielona Gora	Swiebodzin	1/2	-	-	-	10,13	-	-	10,13
Total			11	-	-	-	78,37	16,80	-	95,37

*OZLP: State Forests District Administration
FIJ: Forest inspection jurisdictions

Note: No threat was determined in six OZLP's (Katowice, Krośno, Łódź, Poznań, Szczinec, and Wroclaw); data are lacking from the Bialystok OZLP.

Table 52. Forecast occurrence for the poplar hornet clearwing moth (Paranthrene tabani formis) in 1981

Item No.	OZLP*	Forest inspect. jurisd.	No. of FIJ No. tree flds	Area of threat in ha: up to 4 yrs to 10 %	up to 4 yrs 10-30 %	up to 4 yrs over 30 %	over 4 yrs to 10 %	over 4 yrs 10-30 %	over 4 yrs over 30 %	Total
1	2	3	4	5	6	7	8	9	10	11
1.	Katowice	Katowice	1/2	2,03	-	-	-	-	-	2,03
2	Krosno	Dabrowa Tarnowska	1/2	-	-	-	12,07	-	-	12,07
3	Pila	Walcz	1/2	-	-	-	2,21	-	-	2,21
4	Szczecin	Gorlowek, Gryfice, Debno	3/17	-	-	-	83,11	8,18	-	91,29
5	Szczecinek	Bytow	1/2	-	-	-	1,02	-	-	1,02
6	Torun	Brodnica, Jamy, Skrwilno, Storegord	4/12	-	-	-	47,19	1,98	-	49,17
7	Zielona Gora	Lubsko, Swiebodzin	2/3	-	-	-	17,05	3,00	4	21,21
Total			11	2,03	-	-	164,66	13,16	-	199,74

*OZLP: State Forests District Administration
Note: There was no threat determined in six OZLP's (Krośno, Lublin, Olsztyn, Łódź, Poznań, and Wroclaw); data are lacking from the Bialystok OZLP.

derived on the territory of the Szczecin OZLP, but in comparison with 1979, the significance did not decrease correspondingly.

In 1981, it is predicted that there will be insect control measures carried out against this pest across the entire area of threat (200 ha). It is recommended that active larval holes be sprayed with a 10% solution of Lebaycid.

45. The aspen hornet clear wing moth (Aegeria spiformis Cl.)

In 1980, this pest occurred across the territories of 12 forest inspection jurisdictions in seven State Forest District Administrations, for a total area of about 92 ha (Table 51). Threat on the part of the aspen hornet clear wing moth was not determined in the Katowice, Krośno, Łódź, Poznań, Szczecinek, and Wroclaw OZLP's, and no data were forwarded from the Bialystok OZLP. In comparison with 1979, the area of threat increased by 34.44 ha (60%). Despite this increase, the aspen hornet clear wing moth is a technical poplar pest whose threat across the scale of the whole country is the least, and it is attested across only a small plantation area (less than 100 ha).

It is recommended that in 1981 chemical insect control measures be carried out across the whole area of threat (92 ha) using either Ovadziak or Foschlor.

46. The threat to poplar young tree and parent tree nurseries from technical pests

In 1980, the total area of threatened young tree nurseries was 5.25 ha, and 3.93 ha for parent tree nurseries. In comparison with 1979, there was a decrease in the area of threat to young tree nurseries by 11.93 ha (69.4%), and a drop in the area of threat for parent tree nurseries by 9.11 ha (69.9%).

In parent tree nurseries, the damage ascertained was exclusively by the poplar borer. The greatest amount of attacked rootstock, about 30%, was registered on the territory of the Turek forest inspection jurisdiction (Poznań OZLP) and

Jastrovie forest inspection jurisdiction (Pila OZLP). The killed plots in these forest inspection jurisdictions with a total area of 0.80 ha were specified for liquidation in 1980. In only small intensity (up to 10%) the poplar borer was attested in parent tree nurseries on the territory of the following State Forests District Administrations:

Lublin (1.28 ha) -- in the Lubartów, Luków, Tomaszów, and Zvierzyniec forest inspection jurisdictions;

Poznań (1.60 ha) -- in the Pniewy and Turek forest inspection jurisdictions;

Zielona Góra (0.25 ha) -- in the Wolsztyn forest inspection jurisdiction.

In the young tree nurseries, there was observed only a slight occurrence density of technical pests, and damage to the planted material resulting from them was restricted to only several percent.

The poplar borer occurred on the territories of the following State Forests District Administrations:

Krośno (0.78 ha) -- in the Oleszyce forest inspection jurisdiction;

Łódź (0.60 ha) -- in the Kozienice forest inspection jurisdiction;

Poznań (0.35 ha) -- in the Pniewy forest inspection jurisdiction.

The only occurrence of the poplar hornet clearwing moth was ascertained in the young tree nurseries in the Brynek and Chrzanów forest inspection jurisdictions (Katowice OZLP) across a total area of 3.47 ha. In the young tree nurseries under the Brynek forest inspection jurisdiction, the aspen borer also occurred together with the poplar hornet clear wing moth across an area of 0.05 ha.

It is recommended that chemical insect control against these pests be carried

out in the infested rootstock and that killed trees be removed.

47. Other pests

In 1980, no increased occurrences of poplar leaf-eating pests were recorded in the plantations and afforested areas. It was only in the young tree and parent tree nurseries of the northwestern region of the country (the Poznań, Szczecin, Szczecinek, Zielona Góra OZLP's) that leaf beetles (Melasonia) and blister beetles were attested, locally causing great leaf damage. In addition, in a young tree nursery in the Warcino forest inspection jurisdiction (Szczecinek OZLP) the nun moth occurred uniquely.

In cases where there were numerous occurrences of leaf beetles and blister beetles in young tree and parent tree nurseries, it is recommended that insect control measures be carried out by means of chemicals (liquid Owadofos 50, 0.15%; liquid Foschlor 50, 0.2%; Basudin 25 EC, 0.15%; and liquid Sadofos 30, 0.3%).

PART IV. INFECTIOUS DISEASES

Introduction

In infectious diseases, a large role is played by the internal environment, which affects the economy and pathogenesis, and the course and intensity of the disease. Such factors as temperature, humidity (moisture), light, etc., depending on the meteorological conditions, have the greatest influence.

The past year of 1980 was marked by a cold and precipitation-rich vegetation season. This had a certain effect on the occurrence of diseases, whose extents and intensities were subject to annual variations. Seedling wilt disease, larch litter, pine twist, as well as poplar leaf diseases occurred to a lesser degree. In addition, poplar bark spotting occurred to a weaker degree, and the damaged places resulting from the disease grew over relatively quickly.

In addition, oak fungus disease occurred to a weaker degree than in previous years; however, the occurrence of pine leaf cast was attested at the same average levels.

With respect to the diseases mentioned above, it is possible to predict the intensity of these diseases with a certain, not great probability, being guided always by meteorological observations. On the other hand, the extent of the occurrence of root or trunk diseases (for example, fungus or larch canker, or fir canker) shows small variations from year to year, and it is attested at more or less the same levels independently of weather conditions.

Observations carried out by the District Administrations and the Forest Protection Associations, as well as information from the forest inspection jurisdictions, as well as opinions and land inspections on the part of the workers of the Institute for the Protection of Forests in the Forestry Research Institute, served as the informational material for the development of the following.

1. Parasitic seedling wilt disease

As every year, so too in 1980, one of the most frequently noted infectious diseases of forest tree seedlings was parasitic seedling wilt disease. This malady encompasses only small areas, because it occurs mainly in young tree nurseries, but it is the cause for significant damage. Due to the prevailing numbers of conifer tree nurseries, the greatest losses are recorded within pine nurseries and spruce nurseries.

The most common originators of the disease called seedling wilt disease are fungi from the Fusarium, Cylindrocarpon, Alternaria families, and others, and for beech seedlings, from the family Phytophtera. In addition to the fungi named here, seedlings in young tree nurseries can also be killed by other types not included among the originators of seedling wilt disease, such as for example, Verticillium alboatrum or Botrytis cinerea.

The overall occurrence of seedling wilt disease in young forest tree nurseries is shown in Table 53.

Parasitic seedling wilt disease was recorded often in young tree nurseries laid out under foil tent coverings. These kinds of nurseries have not yet become too popular; however, it should be remarked that seedling resistance under foil covers depends on two factors:

a. a very thorough disinfection of the soil before sowing,

b. good ventilation of the tent coverings, especially during hot weather, and insulation.

In 1981, the Forestry Research Institute recommended that the following be used in control measures against seedling wilt disease in nurseries:

1. Soil disinfection directly before sowing by means of the following

Table 53. The occurrence of seedling wilt disease in 1980

Item No.	OZLP*	Tree culture type Area affected in ha	Forest inspec. jurisd.
1.	Białystok	pine 2	
2	Katowice	spruce, pine, larch 18,01	Suche, Tułowice
3	Kraków	pine, spruce, fir maple, larch 2	Limanowa, Niepołomice, Nawojowa
4	Krosno	pine, fir, spruce larch, sycamore 6,89	Mielec, Nerol, Oleszyce, Żmigród, Kańczuga, Dynów, Lesko, Lutowiska
5	Lublin	pine, larch 2,95	Radzyń, Świdnik
6	Łódź	pine, larch, fir 6,60	Oestynin, Spała, Wieluń, Złoczew, Zwoleń
7	Olsztyn	pine, spruce, birch 5,5	Lidzbark, Nidzica, Stary Jabłonki, Dwukoły
8	Piła	pine, birch 6,93	Jastrowie, Krzyż, Wronki
9	Poznań	pine 2,45	Przedborów, Syców
10.	Szczecin	pine 14,37	Głusko, Karwin, Międzyrzecz, Oźno Lub., Rzepin, Smolarz
11.	Szczecinek	pine, spruce, beech 11,36	Leśny Dwór, Manowo, Osusznica, Świdwin, Białogard
12	Toruń	pine, spruce, birch 15,95	Bydgoszcz, Chocszewo, Mirsdz, Przymuszewo, Tuchola, Włocławek
13	Wrocław	pine, larch, fir 25,78	Bolesławiec, Chocianów, Grochowo, Lubin, Jawor, Świerzdów, Złotoryja, Żmigród
14	Zielona Góra	pine 6,48	Świebodzin, Wymierki Ślawa Śląska

*OZLP: State Forests District Administration

preparations: Cynkotox, Oxafun T, and Funaben T.

For effective disinfection, 10 l of liquid is used per 1 are of nursery. Soil disinfection should be carried out only in young tree nurseries, in which a strong occurrence of seedling wilt disease was attested in previous years.

2. Seed treatment. For this purpose powder preparations of the following should be used: Cynkotox, Funaben T, and Oxafun T.

Five grams of preparations per 1 are of certified seeds should be used.

2. Verticillium deciduous tree wilt (Verticillium alboatrum)

In June, seedling mortality as a result of the occurrence of the Verticillium alboatrum fungus was determined on the territories of several young tree nurseries (the Łódź OZLP).

In the current year, this malady may occur on the same territory again, as deep tillage and soil disinfection are not being applied. Because this disease develops mainly in deciduous tree types, infected areas should be designated for conifer tree type seedlings for several successive years.

3. Gray mold rot of conifer seedlings (Botrytis cinerea)

The occurrence of conifer seedling gray mold rot was confirmed on black pine seedlings in the Kaliska forest inspection jurisdiction (Toruń OZLP), on fir tree seedlings in the Warcino forest inspection jurisdiction (Szczecinek OZLP), and on the common pine from the Łąck forest inspection jurisdiction.

Conditions favorable for the development of this malady are high air humidity and frequent precipitation. It is feared that during the present year, during the humid period, this fungus can also attack conifer seedling trees in the places

where it has occurred before. In connection with this, measures should be taken to sow conifer seed for a period of at least two years on these areas.

This malady has also been confirmed on common spruce seedlings prickly spruce and the savin juniper in foil tent covers (Ustroń forest inspection jurisdiction in the Katowice OZLP). The reason for this, as in the young tree nurseries, is the excess of circulational humidity.

4. Fir seedling decay

Fir seedling decay has been observed in young tree nurseries. The disease has occurred most strongly in the Żmigród forest inspection jurisdiction (1.27 ha, 79%), Kańozuga, Limanowa, Narol, and Dynów. The cause for this decay is probably the fungus Cylindrocarpon destructans. This fungus has been confirmed in soil also in places where fir seedling decay has been found in plants that have seeded themselves.

Fir seedling decay has also been confirmed in foil tent coverings in the Sucha forest inspection jurisdiction (Katowice OZLP). The Forestry Research Institute recommends the use of the same control measures as against seedling wilt disease.

5. Pine leaf cast (Lophodernium pinastri)

Pine leaf cast occurs epiphytically only on the common pine at various ages. However, it is most lethal for pine in the age range 1-5 years, especially in young tree nurseries. The greatest damage has been noted, thus, in young tree nurseries, accompanied by needle decay and by decay of whole cutlings. Pine leaf cast occurs throughout the entire area of Poland, and in weaker or stronger degrees afflicts young tree nurseries, tree fields, and naturally occurring pine tree stands.

Taking this into account, there are records of only those areas, upon which the occurrence of pine leaf cast has been evaluated as medium or strong. Estimations of the extent of damage in young tree nurseries have been carried out using the following scale:

- healthy seedlings -- all the needles are green (0),
- weakly affected -- the number of overall or partially browned needles does not exceed one-third of all needles (1),
- medium affected -- the number of affected needles is greater than one-third to two-thirds all the needles (2),
- strongly affected -- the number of affected needles exceeds two-thirds of all the needles (3).

The evaluation was carried out taking by lots 100 individual seedlings per five ares of nursery. The indicator of the extent of the affliction is determined by multiplying the number of counted seedlings at each individual degree of affliction by the number symbolizing the degree, and then summing the numbers derived, and lastly, dividing the sum of these numbers by the overall number of evaluated seedlings.

If the affliction indicator for a nursery reaches or exceeds the number "1," the nursery is to be considered affected. The data concerning the occurrence of pine leaf cast are shown in Table 54.

In 1981, the Forestry Research Institute recommends using the following in control measures against pine leaf cast:

Cynkotox in a 0.3% water suspension, and
Dithane M-45 in a 0.3% water suspension.

Table 54. Occurrence of pine leaf cast in 1980

State Forests District Admin. [OZLP]	Area affected in ha			Greatest affected area in the forest inspection jurisdiction
	Nurseries	Tree stands		
		up to 20 yrs	over 20 yrs	
1	2	3	4	5
Białystok	56	449	-	Browsk, Dojlidy, Drygały, Giżycko, Głęboki Bród, Płonka, Piesz, Rajgród, Suwałki, Żednia
Katowice	70	229	-	Herby, Olesno, Tułowice
Kraków	7	100	-	Kielce, Włoszczowa, Tuszym
Krosno	3	1690	-	Lesko, Nerol, Oleszyce
Lublin	24	814	226	Biała Podlaska, Chełm, Kraśnik, Międzyrzec, Rudnik, Sobibór, Rozwadów
Łódź	33	785	1700	Dobieszyn, Łąck, Złoczew, Spała /1700 ha > 20/
Olsztyn	4	102		Lidzbark, Nidzica, Szczytno, Zaporowo, Iława
Piła	19	27		Człopa, Mirosławiec, Okonek, Wałcz, Jastrowie
Poznań	36	3		Gniezno, Grodzisk, Kościan. Lopuchówko, Oborniki, Turek
Szczecin	27	1588		Barlinek, Bogdaniec, Dębno, Głusko, Goleniów, Gryfino, Kłodawa, Nowogard, Odno Lub., Skwierzyna, Smolarz
Szczecinek	13	605	2050	Drawsko, Leśny Dwór, Lębork, Osusznica, Świdwin, Ustka, /Świdwin 1800 ha > 20 lat/
Toruń	45	1134	200	Chocenowo, Dąbrowa, Lipusz, Zamrzenica, Osie, Włocławek, Dobrzejewice

1	2	3	4	5
Wrocław	9	7		Chociańów, Milicz, Rudków
Zielona Góra	48	1200		Bobrowice, Krosno, Lubsko, Sulechów, Świebodzin, Wymiarki
Total	394	8733	4176	13303

The consumption of this preparation per one are of nursery should be 30-40 l. All pine nurseries should be sprinkled four times every two weeks from the middle of June, and then subsequently, twice every third week.

As may be seen from Table 54, pine leaf cast was recorded also in young trees (10-20 years growth) and in tree stands with trees older than 20 years. The damage, however, was insignificant.

In 1981, it is not expected that there will be a greater than average occurrence of this malady.

The Forestry Research Institute does not recommend control measures against pine leaf cast in tree fields and young tree (10-20 years growth) nurseries.

6. Larch litter (Meria laricis)

Larch litter occurred in 1980 on the territories of young tree nurseries, tree fields, and nurseries for trees with 10-20 years growth. The disease was recorded in young tree nurseries across an area exceeding 10 ha, in tree fields across an area of 205 ha, and in tree fields for trees with 10-20 years growth, across an area of 100 ha. Weather with a great deal of precipitation favors the occurrence of larch litter, whereas a dry summer restricts its development. To this may also be attributed the occurrence of the disease in tree nurseries for trees with 10-20 years growth.

In 1981, a stronger or weaker occurrence of this disease should be expected, depending on atmospheric conditions and the weather that forms in the summer.

Larch litter was recorded in 1976 in young tree nurseries on the following territories:

- the Bialystok OZLP (Walily forest inspection jurisdiction), 6.20 ha;
- the Krosno OZLP (Narol forest inspection jurisdiction), 1.61 ha;
- the Toruń OZLP, 0.5 ha;
- the Szczecin OZLP (Mieszkowice and Smolarz forest inspection jurisdictions), 2.0 ha.

In tree stands for trees up to 20 years of age, larch litter was recorded in the Katowice OZLP, Krosno and Toruń. It was noted on trees older than 20 years in the Toruń OZLP.

The Institute recommends control measures against larch litter in young tree nurseries by spraying with a 0.5% aqueous suspension of Miedzian 50 at intervals of two to three weeks from May to the end of August. After the leaves fall in the autumn, the cutlings and seedlings should be sprayed one more time with a 1% aqueous suspension of the preparation. About 50 l of working liquid should be used per one are.

7. Oak fungus disease (Microsphaera alphitoides)

This disease has great significance in young oak nurseries, where it may be the cause of serious damage. It is of somewhat less threat in tree fields, on sprouts, and on St. Johns shoots. It may also occur, although only very rarely, on older oaks. Losses result in a significant reduction in growth increases, and even in the decay of young trees, as this happens frequently especially in young tree nurseries.

The occurrence of oak fungus disease can also bring about damage indirectly, and the freezing of young oaks is especially frequently seen in young tree nurseries, because, as a result of being affected by this disease, they did not achieve their so-called winter maturity in the vegetation period.

Table 55. Occurrence of fungus oak disease in 1980

State Forests District Administ. [OZLP]	Area affected in ha			Greatest area affected in forest inspection jurisdictions:
	Nurseries	Tree stands up to 20 yrs	Tree stands over 20 yrs	
Białystok	6,20			
Katowice	24,28	63		
Kraków				
Krosno	1,00	307	118	
Lublin	5,10	332	250	Mirosz, Strzelce, Tomaszów
Łódź	2,16	982	550	Dobieszyn, Grójec, Łąck, Przysucha, Radom, Spała, Zwoleń
Olsztyn	26,25	450	-	Dwukoły, Górowo Iławeckie, Lidzbark
Piła	1,64	40	70	Sarbia, Wronki, Złotów
Poznań	13,00	7		Antoni Grodziak, Gniezno
Szczecin	6,10	10		Barlinek, Bogdaniec, Gryfino
Szczecinek	5,00	145		Drawsko, Dretyń, Lębork, Świdwin, Ustka
Toruń	6,67	830	118	Chocsano, Mirosz, Włocławek
Wrocław	5,55	520		Dębno, Jawor, Jugów, Olawa
Zielona Góra		30		Gubin
Total	102,95	3686,0	1106,60	4 889,55

The occurrence of oak fungus disease is conditioned by meteorological conditions: a dry and sunny summer favors the development of the disease. The disease develops most strongly, when after a dry sunny June, there ensues a humid summer. Depending on the form of the meteorological conditions, intense occurrences of oak fungus disease should also be expected in 1981.

The Forestry Research Institute recommends the use of the following spray preparations against oak fungus disease:

- Siarkol Extra in a 0.6% aqueous suspension. The use of this working liquid in a tree nursery should be about 20 l/ar.

The spraying should begin from the moment when the first symptoms of the disease appear (in June), and should be repeated three to four times at three-week intervals.

8. Pine twist rust (Melampsora pinitorqua)

In 1980, the occurrence of pine twist rust underwent a marked slowdown. Over a period of several years there has been observed with apprehension a gradual but continuous increase in the surface area of tree fields and the number of young pine trees (10-20 years growth) stricken by this disease. This was in connection with the mild winters. A reduction in the surface area for the occurrence of this disease has been observed, however, since the frosty winter of 1978/79. In 1979 there was still reported the occurrence of pine twist rust on about 1,000 ha, which in comparison with 1975, was about 40%. In 1980 the suppressed area was 450 ha. The disease was noted in the following OZLP's:

Katowice: 5 ha;
Krosno: 1.1 ha;
Lublin: 109.0 ha (Biala Podl, Luków, Pulawy forest inspection jurisdictions);
Lódź: 190.0 ha (Dobieszyn, Lutomiersk, Przysucha, WZL forest inspection jurisdictions);
Pila: 3.0 ha;
Szczecin: 36.41 ha (Gryfino, Nowogard forest inspection jurisdictions);
Szczecinek: 4.0 ha (Ustka forest inspection jurisdiction);
Toruń: 94.0 ha;

Wroclaw: 8.0 ha (Olawa, Roszów forest inspection jurisdictions).

The weather conditions of the winter of 1980/81 make it possible to presume that during the vegetation season of 1981 pine twist rust will occur also only to a weak degree.

9. Other diseases of the assimilational apparatus

In certain afforested young tree nurseries, there has been observed the curling up of oak leaves with visible brown necrotic splotches. The cause for this is the fungus Apiognomonia errabunda.

Leaf mortality and leaf splotches have been observed on chestnut tree leaves in several young tree nurseries. The reason for this is the fungus Guignardia aesculi.

Both these fungi restrict assimilation. Control measures, in general, were not carried out. It is possible to apply a spray preparation of 0.5% Miedzian 50 only in the case of a very strong occurrence in a young tree nursery.

10. Honey fungus (Armillariella mellea)

The surface of tree stands afflicted by honey fungus and root fungus has been subject for a series of years to only slight variations. These variations, from the period when former arable lands were forested, have been showing from year to year upward tendencies. This concerns also single-strain tree stands, and in the case of honey fungus, conifer tree stands introduced in deciduous areas.

We should also take into consideration that recorded occurrences of the disease do not give a complete picture of the occurrence of these two types of threatening parasites, because this concerns only areas stricken to a strong

Table 56. Occurrence of honey fungus (Armillariella mellea) in 1980

Item No.	State Forests District Administrat. [OZLP]	Surface suppressed in ha of tree stands up to 20 yrs	Surface suppressed in ha of tree stands over 20 yrs	The stronger occurrences in forest inspection jurisdictions
1.	Białystok	2441	4160	Białowieża, Borki, Browsk, Dojlidy, Drygały, Giżycko, Płaska, Pisz, Suwałki
2	Katowice	2147	17594	Andrychów, Chrzanów, Sucha,
3	Kraków	1541	8888	Gromnik, Kielce, Krościenko, Limanowa, Lesie, Nawojowa, Miechów, Pińczowa
4	Krosno	690	11080	Brzegi Dolne, Kołaczyce, Lukasiewicze, Olszyce
5	Lublin	980	1375	Mińsk Mazowiecki, Sarnaki, Siedlce
6	Łódź	1184	4890	Grójec, Poddębice, Spała, Złoczew, WZL
7	Olsztyn	4890	21680	Górowo Iławeckie, Lidzbark, Nowe Ramuki, Strzałowo, Wipsowo, Iława, Mrągowo
8	Piła	171	75	Okonek
9	Poznań	576	341	Gniezno, Konin
10	Szczecin	933	988	Bierzwnik, Dębno, Lobez, Smolarz, Kłodawa
11	Szczecinek	1620	5536	Lędy Dwór, Lębork, Niedźwiady, Osusznica, Świdwin, Ustka
12	Toruń	1190	2617	Chocimowo, Staregard, Tuchola, Kolbudy
13.	Wrocław	3242	6950	Bystrzyca Kłodzka, Duszniki, Jawor, Międzylesie, Świdnica, Wałbrzych
14	Zielona Góra	386		Gubin
Total		21997	87180	109 177 ha

Lp.	OZLP	Pow. opanow. w ha drzewostany		Najsilniejsze wystąpowanie w nadleśnictwach
		do 20 l.	ponad 20 l	
10	Szczecin	933	988	Bierzwnik, Dębno, Lobez, Smolarz, Kłodawa
11	Szczecinek	1620	5536	Lędy Dwór, Lębork, Niedźwiady, Osusznica, Świdwin, Ustka
12	Toruń	1190	2617	Chocimowo, Staregard, Tuchola, Kolbudy
13.	Wrocław	3242	6950	Bystrzyca Kłodzka, Duszniki, Jawor, Międzylesie, Świdnica, Wałbrzych
14	Zielona Góra	386		Gubin
Total		21997	87180	109 177 ha

degree. On the other hand, medium and weak occurrences are not entered in the record, so that as a result, there is no indication of them, and this may result in an increased occurrence of this disease in the near future.

The greatest damage of the years recorded are in the piedmont territories (the Katowice, Kraków, Krosno OZLP's), as well as in the Olsztyn region. It is mainly spruce tree stands that suffer from honey fungus on the plateau, whereas, on the other hand, damage is also observed on both spruce and pine in the lowlands. Across the area of the very rapid dissemination of honey fungus in the Carpathian Mountains and the Mazovian Mountains, which began in the middle of the 1950's, the suppression of new territories by this pathogen has undergone a certain slowing down. In mountains it is possible to recognize tree stands free of honey fungus, or which are suppressed to only a weak degree and are relatively resistant. This may be ascribed to the stable course in the occurrence of honey fungus that has been occurring now for a series of years.

The occurrence of honey fungus in fir trees observed in the Katowice OZLP in the Węgierska Górka, Wisla, Ujsoly, and Ustroń forest inspection jurisdictions could be the cause for apprehension.

11. Annosus root rot (root fungus) (Heterobasidion annosus, Fomes annosus)

The extent of the occurrence of root fungus is at the same level as it has been for many years.

For many years the greatest areas afflicted by root fungus in tree stands has been recorded on the territories of the Olsztyn, Szczecinek, and Toruń OZLP's.

The Forestry Research Institute (Institutes for Forest Protection and Forest Cultivation) has developed instructions in the matter of cultivation and protection measures to be carried out in territories threatened by the occurrence of parasitic root fungi to the NZLP [expansion unknown]. The offered suggestions

include the entire production cycle, beginning with soil preparation and proceeding to safeguard measures to be carried out on tree stumps. These instructions should be applied by all alpine units. The Institute recommends the following four control measures to be used against annosus root rot: a biopreparation made with the fungus Phebia gigantea for safeguarding tree stumps against primary infection from root rot (in 0.5 and 1 l cylinders). Method of use: the contents of the cylinder should be thoroughly mixed together with 10 l of water. The working liquid derived in this way should be sprayed on the stumps of recently cut trees (the stump faces should be scored with an ax or saw), and it should be covered with forest litter. One liter of working liquid is sufficient for safeguarding about 80 tree stumps.

At the present time, the Forestry Research Institute is working on perfecting a means for safeguarding tree stumps that are left during nursery cultivation operations against primary infection by root rot.

12. Pine stem rust (Cronartium flaccidum)

Similarly to root fungi, pine stem rust is indicated across many thousands of hectares. This disease strikes mainly trees 20 to 50 years old.

If nursery cultivation measures are neglected, it may have serious economic significance directly as a source of decay for a portion or for even the entire crown, and indirectly by weakening the tree by increasing the possibility for its suppression by honey fungus. In 1980, the occurrence of pine stem rust was recorded on a total of 41.1 thousand ha. The greatest area was confirmed on the territories of the Łódź OZLP.

In 1981, the Forestry Research Institute recommends prophylactic measures over the long run, relying on the removal from the tree stands of trees or shoots afflicted by the disease.

Table 57. Occurrence of annosus root rot in 1980

Item No.	OZLP*	Tree stds in ha		Forest inspection jurisdiction
		up. to 20 yrs	over 20 yrs	
1	Białystok	1565	5210	Białowieża, Drygały, Giżycko, Płaska, Suwałki, Pisz
2	Katowice	536	913	
3	Kraków	34	726	Gromnik, Nowojowa
4	Krosno	-	825	
5	Lublin	1338	1046	Lubartów, Łuków, Sobibór
6	Łódź	853	4111	Brzeziny, Grójec, Łąck, Piotrków, Poddębice, Spała, Złoczew
7	Olsztyn	2840	25200	Dwukoły, Górowo Iławeckie, Lidzbark, Miłomłyn, Nowe Ramuki, Szczytno, Wipsowo
8	Piła	250	2820	Człopa, Jastrowie, Okonek, Sarbia, Trzcianka, Wałcz
9	Poznań	1005	2950	Babki, Gniezno, Konin
10	Szczecin	1010	1860	Dębno, Lobez, Smolarz
11	Szczecinek	3641	18670	Białogard, Leśny Dwór, Lębork, Niedźwiady, Osusznica, Połczyn Świdwin, Ustka
12	Toruń	2693	7645	Lipusz, Starogard, Włocławek
13	Wrocław	363	4248	Bystrzyca Kł., Duszniki, Lwówek, Międzylesie, Strachocin, Świdnica, Złotoryja
14	Zielona Góra	-	-	
	Total	16.128	76 024	92 152 ha

*OZLP: State Forests District Administration

13. European larch canker (Lachnellula willkommi)

This threatening larch disease was recorded mainly in plateau territories, where it has caused damage for many years. The area of occurrence has been subject for a series of years to only slight variations. European larch canker is particularly dangerous for young trees in age classes from several years to 30 years. The occurrence of this disease was confirmed on 352 ha of larch in the Krosno OZLP in age classes up to 20 years, and across 10 ha of older trees.

Table 58. Occurrence of pine stem rust in 1980

OZLP*	Tree stands in ha			Forest inspection jurisdictions
	up to 20 yrs	over 20 yrs	total	
Białystok	15	4960	4975	Dojlidy, Drygały, Głęboki Bród, Płaska, Suwałki, Szczebra
Katowice	20	123	143	
Kraków	24	599	623	Kielce, Suchedniów, Włoszczowa
Krosno	-	-	-	
Lublin	10	1392	1402	Biała Podl., Sobibór, Sokołów
Łódź	95	6535	6630	Brzeziny, Grójeć, Łąck, Piotrków, Przysucha, Poddębice, Złoczew, WZL
Olsztyn	20	1130	1150	Lidzbark, Stare Resuki, Szczytno, Zaporowo
Piła	-	1225	1225	Okonek, Sarbie
Poznań	200	1180	1380	Gniezno, Grodzisk, Konin, Lopuchówko, Pniewy
Szczecin	42	470	512	Dębno, Gryfino
Szczecinek	10	591	601	Lębork, Osuszenica, Ustka
Toruń	41	885	926	Chocszewo, Lipusz, Włocławek
Wrocław	-	-	-	-
Zielona Góra	-	700	700	Wymierki
Total	487	19 790	24 877	41 154 ha

*OZLP: State Forests District Administration

The Institute is carrying out work on a search for strains of Polish larch resistant to this disease.

14. Yellow broom rust of fir (Melampsorella caryophylla cearum)

The range of this disease is restricted to the exact range of the occurrence of fir. In connection with this, for a series of years it has been recorded only in mountain territories, in the Carpathians and in the Holy Cross Mountains. It has been confirmed on the territory of the Krosno OZLP across an area of 11,330 ha, including 200 ha in tree stands with age classes lower than 20 years. In the

Kraków OZLP, yellow broom rust of fir has been recorded across 2,356 ha in tree stands with trees older than 20 years. In the Holy Cross Mountains (Lódź OZLP), the occurrence of yellow broom rust of fir has been confirmed across 50 ha.

Trees stricken by this disease can be easily broken by the action of violent winds and strong snowfalls. The disease causes great devastation in tree stands that are neglected. The Institute recommends against yellow broom rust of fir, for the long run, the careful removal of cankerous tree trunks from the forest, beginning with the earliest extirpation. This operation should be carried out repeatedly. In addition, pruning the branches with diseased areas on them will prevent the spread of the disease.

15. Red ring fungus (Phellinus pini)

This parasite is registered across a relatively large area; however, its attestation is not a matter of absolutely factual record. According to observations, about 8% of the annual harvested pine forest timber-cutting produce shows rot to the most valuable lumber in the lower part of the tree as a result of the effects of red ring fungus. In 1981, from data gathered from the field, it is indicated that this parasite occurs across a surface of 4,314 ha. The greatest surface area of suppressed pine tree stands is registered on the territory of the Pila and Poznań OZLP's (Table 59).

According to determinations, annual losses caused by red ring fungus amount to about 0.5 billion zlotys.

16. False tender fungus (Phellinus igniarius)

This parasite, which mainly causes the decay of aspen lumber, hornbeam, oak, willow, and maple, has been recorded on about 1.0 thousand ha (Table 59).

All mechanical wounding and damage to trees increases the possibility of infection. False tender fungus mainly attacks healthy, vigorously growing trees

Table 59. The occurrence of red ring fungus, false tender fungus, and Dutch elm disease in 1980

OZLP*	Area of occurrence in ha			Forest inspection jurisdiction
	red ring fungus 1/	false tender fungus 2/	Dutch elm disease 3/	
Białystok	110	240		1/ Białowieża, Płaska
Katowice	670	-	28	
Kraków	-	-	-	
Krosno	80	-	-	
Lublin	50			Chełm
Łódź	226	399	1	1/ Grójec, Łęck, Spała 2/ " - " 3/ " - -
Olsztyn			20	Lidzbark
Piła	1800		2	1/ Okonek 3/ Człopa
Poznań	1200	7	10	1/ 2/ 3/ Babki, Gniezno
Szczecin	40	300	4	1/ Rzepin 2/ Dobrzany 3/ Dobrzany
Szczecinek	35	-	1	1/ Człuchów 3/ Świdwin
Toruń	95		36	1/ Lipusz
Wrocław	-	-	15	3/ Oława
Zielona Góra	8		50	1/ Gubin 2/ Zielona Góra
Total	4314	946	167	

*OZLP: State Forests District Administration

in the prime of their lives, but nevertheless, it increases losses.

This fungus also causes serious damage in parent tree nurseries among the root stock of poplar, as well as in older poplar plantations and afforested areas. In parent tree nurseries, approximately 90% of the root stock in age classes greater than seven years is rotten as a result of being afflicted by this fungus. Older poplar trees will be decayed and hollowed out as a result of the decay of the wood attacked by false tender fungus.

17. Sulphur shelf (Laetiporus sulphureus)

Sulphur shelf has been recorded for a long time only across small areas and only sporadically. At the present time it does not have any economic significance as an oak parasite.

18. Dutch elm disease (Ceratocystis ulmi)

The significance of this disease is great, but mainly outside of forests. It attacks and destroys elms of all ages. In 1980, Dutch elm disease was recorded across approximately 170 ha. It mainly afflicts trees in parks and along thoroughfares and adjacent to residences and other structures.

The state of health of rapidly growing trees (mainly poplar) in 1980

Under our climatic conditions the diseases affecting the assimilational apparatus, as well as diseases of shoots, branches, and trunks, have the greatest significance among poplar diseases.

1 - shepherd's crook shoot blight in aspen and poplar (Venturia tremulae and Venturia populina);

2 - poplar rust (Melamsora spp.);

3 - poplar leaf anthracnose (Marssonia, spp.);

4 - poplar curl (Taphrina populina);

5 - bacterial poplar canker (a collection of bacteria from the families of Aplanobacterium, Hrvinia, and others);

6 - canker of poplar (Chondroplea [Dochichiza] populea);

7 - poplar bark canker fungus (Cytospora chrysosperma);

8 - poplar bark spotting (canker).

The material used in developing this information, in contrast to that mentioned in the introduction, was also taken from health control protocols taken from poplar planted material in young tree and parent tree nurseries.

19. Shepherd's crook shoot blight in poplar (Venturia spp.)

Several years ago this disease caused significant destruction in young poplar tree nurseries, causing restricted growth and fruticose types of seedlings. Recently it has been occurring somewhat less frequently.

Most frequently it is aromatic poplar that suffers from this disease, and among them the Hybrid 275 and Hybrid 194.

Table 60. Occurrence of more important poplar diseases in 1980 (area in ha)

OZLP*	Poplar rust		Canker of poplar		Poplar bark canker fung.		Bacterial poplar canker
	Parent tree nurs.	Plantations	Parent tr. nur.	Plantations	Parent tr. nur.	Plantat.	
Białystok	1,0	10,0	19,0	-	-	-	46,0
Katowice	-	1,3	-	2,0	1,0		13,29
Kraków	5,75	3,0	-				
Krosno	-	130,0	-	43,5	-	-	-
Lublin	13,74	184,0	0,24	-	0,5		58
Łódź	0,20	11,0	-	31,0	0,6		
Olsztyn	-	-	-	-	-	-	-
Piła	0,20	0,1	-	4,0	-	-	2,0
Poznań	-	-	-	-	-	-	-
Szczecin	5,3	136,62		1,0	-	-	0,2
Szczecinek	1,1	12,0	-	-	-	-	-
Toruń	5,0	66,0	-	1,0	-	-	11,0
Wrocław	-	-	-	1,5	-	-	-
Zielona Góra	0,58	-	-	-	-	3,29	-
Total	32,87	554,02	19,24	84,00	2,10	3,29	130,49

*OZLP: State Forests District Administration

20. Poplar rust (Melampsora spp.)

Poplar rust is one of the most common poplar diseases. It attacks both healthy poplars in full vigor, as well as weak poplars. By attacking the assimilational apparatus, it brings about a restriction in growth, as well as increasing its susceptibility to other infectious diseases, which may bring about death in trees weakened by poplar rust.

In 1980, poplar rust was recorded in nurseries over an area of 33 ha, and in plantations over an area of 554 ha.

21. Poplar leaf anthracnose (Marssonina spp.)

For several years this disease, which is considered the most threatening for poplar in Western European countries and North America, has been observed in Poland. A sea climate favors this disease, but on the other hand, a hot summer and rough winters have a braking effect on its development. In 1980, poplar leaf anthracnose was observed in Poland across a small area. Under our climatic conditions, this disease occurs mostly at the end of the vegetation season, causing a drying out and falling of the leaves. It can only bring about a restriction in growth in the case of epiphytosis repeated over a series of years together. The frosty winter of 1980/81 makes it possible to suppose that in the current year this disease will occur in an intensity that would be no cause for apprehension, and will cause no restriction in poplar growth.

22. Poplar curl (Taphrina populina)

This fungus appears on the poplar leaves of Euroamerican poplar trees, causing disfigurement of the leaves in the form of sunken splotches having a bright yellow color.

This fungus is considered to be a parasite without economic significance. It is often mistaken, however, for poplar rust, and it may be a source of

apprehension for cultivators. No control measures are undertaken. The fungus is wiped out when control measures are taken against poplar rust or against poplar leaf anthracnose.

23. Poplar bacterial canker (bacteriosis)

For several years this has been the worst disease among our poplar trees. The cause of the disease is a collection of bacteria from the families Aplanobacterium, Erzinina, Pseudomonas, and others, which attack the trunk and branches of the poplar. Aromatic poplars are particularly susceptible to this disease. At first it was thought that poplars of the younger age classes, up to five years, were resistant to bacteriosis. It became apparent quickly, however, that the disease was attested in seedlings and young tree nurseries as well. The bacteria usually infect the trees during lower branch trimming, or during the formation of the seedling crowns. All the damage is mechanical, and the open wounds that are not taken care of properly become infection pathways for the bacteria.

In 1980 bacteriosis was recorded on an area of about 130 ha.

24. Canker of poplar (Chondroplea [Dothichiza] populea)

This disease occurs most frequently in weak seedlings, or in seedlings weakened by other factors.

It is also a frequent cause of mortality among cutlings. It is possible to assert with good probability that 90% of the lack of success in tree fields based on cutlings is brought about by infections of this disease. Poplars in the species Aigeiros are especially susceptible to canker of poplar. In addition to young seedlings, the disease also afflicts trees in plantations weakened as a result of transplanting in the first two to three years after setting up the plantation. Older plantations are afflicted only in the case of neglect in basic nursery operations, mainly such kinds of neglect as, for example, delayed trimming

back of the lower branches, or the untimely setting up of framing support, mechanical damage that has not been taken care of, etc. In addition, a long period of drought with a low water table can be the cause for strong development in canker of poplar.

In 1980, canker of poplar was recorded on about 100 ha (in young tree nurseries, about 20 ha, and in plantations, 84 ha).

25. Poplar bark canker fungus (Cytospora chrysosperma)

Poplar bark canker fungus caused no serious damage in 1980. The occurrence of this disease was recorded on about 5 ha. The favorable conditions for the development of poplar bark canker fungus are all weakening factors, as well as unfavorable atmospheric conditions, insect feeding, and the occurrence of other fungus diseases (poplar rust, canker of poplar).

26. Poplar bark spotting

This disease has a physiological character, and its most frequent cause is disturbance in the tree's water economy. Under favorable conditions, wounds may heal over the period of the vegetation season, but, on the other hand, when atmospheric conditions are not favorable for poplars (for example, a dry spell), the wounds will not grow over, or else will grow over very slowly, becoming infection pathways for canker of poplar or bacteriosis.

Under our climatic conditions, the "Robusta" suffers most from poplar bark spotting. The "Marilandica" and "Gelrica" suffer somewhat less. Poplar bark spotting is also important for "I-214."

In 1980, poplar bark spotting occurred only sporadically. The going over of wounds was observed during the spring. It seems that the relatively large amount of precipitation during the vegetation season in 1980 led to a reduction in long-term effects and their rapid healing.

RECOMMENDATIONS OF THE INSTITUTE CONCERNING POPLAR DISEASES

I. Prevention and Control Measures Against Diseases in the Planting Material

a. Cutlings

In the period from January to March, an introductory, orientation check of the state of health of the cutlings should be carried out. For this purpose samples should be taken primarily from the most threatened plots using 50-piece samples of cutlings, separated according to individual types, varieties, or cultures of poplar. The cutlings from individual samples should be bound together in bunches and placed in flower pots (or containers) filled with moist soil to a vertical depth of about 5 cm.

The pots with the cutlings should be placed in a warm storage area, with as much sun as possible, and as soon as possible, the soil should be watered for the purpose of maintaining suitable moisture. After two to eight weeks, depending on the temperature, the percent of cutlings afflicted by infectious diseases or frozen should be determined for each sample, counting the cutlings with splotches and those that have become blackened, which have not sent up shoots or developed roots.

A second control check of the state of health of the cutlings should be carried out after they have been taken out of their pits and before they are transported for further production. Control should be performed primarily on those portions of the cutlings, for which the initial health check revealed more than 20% of the individuals without shoots or roots. Samples for control should be sampled by batch in bunches of 50 pieces from single-strain types, keeping in mind the type, variety, and culture according to the following amounts: at least 10 bunches in batches numbering less than 10,000 cutlings; at least 20 bunches in batches numbering more than 10,000 cutlings. The sample cutlings should be studied, after a thorough inspection, by cutting through the bark and searching for

dark splotches appearing under the bark and testifying to the presence of fungi, as well as by testing the state of health of the buds. If the control reveals that the portion of diseased cutlings in an examined batch exceeds 20%, the entire group of cutlings belonging to that batch should be sorted out in a timely fashion, and the stricken cutlings should be burned. The plots of a parent tree nursery producing this kind of cutling should be liquidated in the shortest possible time (the rootstock should be dug up and burned, and the earth should be plowed over deeply).

If the control shows that the portion of afflicted cutlings amounts to less than 20%, it is possible to transmit them along for further production, while informing the collectors at the same time that the cutlings should be resorted before planting, and the affected individuals should be burned.

During planting, only those cutlings should be taken from the stores, their pits, etc., that can be planted within a period of two hours. The material coming from the stores should be appropriately safeguarded against drying out (for example, by means of moist moss) before they are planted.

Immediately before planting, the cutlings should be bathed for a period of 20 to 30 minutes in water with an additive of a 1% preparation of Miedzian 50, or a 0.5% aqueous solution of copper sulphate. In preparing the solution and the bath for the cutlings, the use of metal tools that have not been enamelled should be avoided.

b. Seedlings

In November (before pitting), a health control check should be undertaken for seedlings produced in the nursery. All young trees with symptoms of infectious disease, as well as weak trees with the look of sickness, should be sorted out and burned without delay. The effects of infectious diseases on annual seedlings is detected mainly on the basis of the cutling from which the shoot grows.

As a result of infection, the cutling will be darkened, having splotches or spots, or else it will be weakly rooted.

After being taken out of the stores, or out of the pits, the seedlings should be properly safeguarded against drying out of their roots.

Seedlings with growths in their roots or in their root neck should be sorted out and burned.

II. The Protection of Parent Tree Nurseries, Young Tree Nurseries, and Plantations

a. General considerations

New poplar tree fields should not be planted in the neighborhood of fields that have already been suppressed by pests or infectious diseases. In the case of determining infectious poplar diseases in a former poplar tree field, before the new tree field is planted the source of infection should be removed by removing the affected trees or branches, and by applying, where possible, chemical control methods.

Neighboring spruce and aspen trees should be removed for parent tree nurseries, young tree nurseries, and plantations because of the danger of infection by poplar rust.

Parent tree nurseries, young tree nurseries, and plantations are required to undergo obligatory health checks (Instructions for the Protection of Forests, p. 2, para. 596-605).

b. Parent tree nurseries

During the entire vegetation period, parent tree nurseries should be

systematically checked every two weeks for the purpose of determining their state of health.

In the case of discovering dead rootstock or poorly growing (with a small number of shoots) plants, or else plants with obvious symptoms of the effects of infectious disease, the rootstock should be dug up and burned.

If the portion of sick or dead rootstock in a given plot exceeds 20% of the overall plot, it should be promptly destroyed (dig up and burn the rootstock and replow the soil).

For the purpose of restricting occurrences of infectious diseases, spray preparations of Miedzian 50 are used; a 0.5% aqueous solution is used on shoots with leaves, and a 1% aqueous solution on shoots without leaves.

These measures should be carried out five to six times beginning in June at intervals of about three weeks. The spraying should be carried out in the morning hours or in the afternoon hours, in order that the leaves not be exposed to the rays of the sun. At the conclusion of the vegetation period, after the leaves have fallen off, one more spraying with a 1% aqueous suspension of Miedzian 50 preparation should be carried out. This operation is particularly important, because soon after the leaves fall off, there are pathways for the penetration of pathogens.

If it is feared that the preparation has been washed away over the course of 24 hours after atmospheric precipitation, the spraying should be repeated.

The working liquid consumption per 1 ha amounts to about 400-500 l. During the carrying out of this operation, the liquid should be mixed up from time to time, so that the preparation will not settle.

In the case of discovering the occurrence of poplar rust or poplar leaf

anthracnose on the leaves to a medium or strong degree, the fallen leaves from the autumn should be removed and destroyed.

The degree of affliction by poplar rust or poplar leaf anthracnose on the leaves is determined using the following scale:

- up to 20% suppressed leaves -- weakly affected,
- from 21 to 50% suppressed leaves -- medium affliction,
- greater than 50% suppressed leaves -- strongly affected.

During the removal of twigs, the following should be observed:

- avoid trimming shoots and producing cuttings during frost in order not to expose the rootstock to freezing;
- disinfect the tools used for cutting by wiping them with denatured alcohol before setting about the pruning of the shoots of each rootstock;
- wipe the surface of cuts on the rootstocks, in addition, after gathering the twigs with a solution consisting of 3% Miedzian 50, and a white emulsion paint and water in the proportions of 2 : 1.

For this purpose, take 45 g of Miedzian 50 dissolved in 0.5 l of water, and mix in 1 kg of white emulsion paint; after thorough mixing, apply this mixture to the cut on the rootstock.

c. Young tree nurseries

During the entire vegetation period, the state of health of the seedlings in the young tree nurseries should be checked two times weekly.

For the purpose of safeguarding against the occurrence of infectious diseases, the following should be observed:

- avoid the accumulation of weeds,
- trim away and burn dead shoots or those bearing traces of infectious disease; dead seedlings should be removed and burned,
- from June until the autumn, spraying of the young tree nurseries with an aqueous solution of a preparation of Miedzian 50 should be carried out at two to three week intervals on shoots bearing leaves in the concentration of 0.5%, and on shoots without leaves, in a concentration of 1%. A last operation should be carried out after the conclusion of the vegetation period and the falling of the leaves.

In the case where the occurrence of poplar rust is determined in a medium or strong degree, the fallen leaves in the autumn should be removed and destroyed. (The method of determining the degree of affliction has been given in the description of control measures in parent tree nurseries.)

d. Plantations

In the first three years after planting a plantation, protective spraying beginning in June and carried out every three to four weeks should be applied to shoots with leaves with a 0.5% solution of Miedzian 50 dissolved in water, and a 1% solution of Miedzian 50 after the leaves have fallen, taking care that the leaves are not exposed to the rays of the sun.

Shoots and branches on which symptoms of disease are discovered should be trimmed away and burned. All dying and dead trees must be removed and burned.

Wounds that occur during the trimming of lower branches should be safeguarded in the manner cited below:

Sixty grams of a preparation of Miedzian 50 should be dissolved in 1 l of water and mixed together with 1 kg of white emulsion paint. The preparation must be well mixed (sediments often form in paint cans), in order to form a

substance with a uniform thickness. The preparation derived in this way and containing 3% Miedzian 50 should be smeared thoroughly on the wound immediately after pruning the branches. During the cutting, care must be taken so that the surface of the wound is as smooth as possible. Underbranch pruning should not be carried out during rainy weather, because the paint can be washed away before it dries (about two hours) by the rain. After it dries, it cannot be washed away.

The tools used during underbranch pruning must be disinfected by a preparation of denatured alcohol before pruning the branches of each tree.

For the purpose of restricting the occurrence of poplar bacterial canker, when the wounds encompass less than one-third the trunk and they are not longer than 50 cm, th following operation can be carried out:

The cankerous tissue of the bark and cambium should be cut out, as well as the bronze discolored wood, until completely healthy and live cambium tissue is reached, the wound should be evened off until as smooth a surface as is possible is made, and then it should be thoroughly smeared with a preparation prepared (according to the recipe given above) from 3% Miedzian 50 and emulsion paint with water in the ratio of 1 : 1. This operation should also not be carried out during rain because of the possibility of washing away the wet emulsion paint.

Table 61. Tabulation of fungicides for control measures against fungus diseases in 1981

Name of preparation	Toxicity class	Waiting period (in days)	Fungus diseases	Type of operation	Prep. proportion per ha	Notes
Cynkotox effective component, zineb, 65% Oxafun T (carbixine, 37.5%), thiuram, 37.5% Funaben T carbendasine, 20%, thiuram 45%	IV	-	Wilt fungi	Soil treatment & disinfection	2 kg per 10 l of water per are	Spraying & harrowing the soil
Cynkotox			Pine leaf cast (in young tree nurseries)	Motorized spraying, knapsack or ground equipment	120 g per 40 l of water per are 40 l, 0.3% suspension	From mid-June to end August (The 3 first sprayings should be carried out twice weekly, & then subsequently 3 times weekly)
Dithane N-43 effective component, mankogeb, 30%	IV	-	"	"	"	Application & proportions same as with Cynkotox

Miedzian 50	IV	-	Poplar rust, canker of poplar	Motorized spraying. Bathe cuttings before planting	(0.5% suspension) (1% suspension)	Operation to be carried out on a sunless day
Miedzian 50	IV	-	Canker of poplar	Motorized spraying.	1% or 0.5% suspension	Shoots without leaves, 1% Shoots with leaves, 0.5%
			Larch litter	"	"	" "
			Canker of poplar and poplar bacteriosis	Smear wounds after lower branch pruning & restrict spread of disease	3% suspension in 50% solution of white emulsion paint + 50% water	Operation to be carried out during rainless weather
Bentale effective component, benomyl, 50%	IV	-	Poplar bacteriosis	Smear wound after lower branch pruning & restrict spread of disease	0.1% per 50% white emulsion paint + 50% water	Operation to be carried out during rainless weather
			Wilt fungi	Soil treatment & disinfection	10 g per kg of seeds, 0.5 kg per 10 l of water per are	Spraying & harrowing

Bayleton effective component, triadimeton	III	-	Oak fungus disease	Spraying	1,000 l in 0.1%	(1) In the initial phase of leaf development, (2) at end of July or beginning of August
Siarkol Extra (sulphur)	V	-	"	"	2,000 l in 0.6% aqueous suspension	From June every third week, 3-4 times
P.g. IBL biopreparation from Phlebia gigantea	-	-	Root fungus	Spraying of recently cut tree stumps	1 l of prep. per 10 l of water for 80 tree stumps	Directly after cutting the tree stump

Table 62. Tabulation of insecticides for control of forest insects in 1981

Name of preparation	Toxicity class	Waiting period (days)	Pests	Type of operation used	Preparation proportions per ha
Actellic	III	-	Primary	Airplane	0.1 l
Ambusz 25 EC	IV	14	"	"	0.1 l
Decis 2.5 EC	II	14	"	"	0.15 l
Dursban*	II	14	Secondary	Ground material	2% solution
Gamametox Avia*	III	21	Primary	Airplane	10-12 l
Gamakarbatox suspension	III	21	Secondary	Ground material	3% solution
Lasochron D*	II	30	"	"	solution 1 : 8 or 1 : 6
Lasochron F*	III	-	Primary	Airplane	8-10 l
Liquid Metax 30	IV	14	Curculionid in tree fields	Ground material	2% solution
Mglawik Extra	III	7	Primary	Airplane	6-8 l
Mglawik L-8*	II	21	"	"	10-12 l
Nexion 40 EC	III	14	"	"	according to label
Nuvacron 40 EC*	I	40	Secondary	Ground material	5% solution
Owadofos 50	III	14	Primary	Airplane	2% solution
Liquid Owadofos 50*	III	14	Secondary	Ground material	5% solution
Powder Owadofos	III	14	Primary	Airplane	30-35 kg
Powder Owadziak 1,2	III	-	Soil	Mechanical distribution	100-200 kg
Powder Owadziak 2,4	III	-	"	"	80-150 kg
Pedraczak 2	III	-	"	"	100-200 kg

Ripcord 40 EC	III	14	Primary	Airplane	0.025-0.037 l
Sumicidin 20 EC*	III	14	"	"	0.1 l

*preparation in the process of being registered